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PROCEEDINGS

OF THE

AMERICAN SOCIETY

OF

CIVIL ENGINEERS

VOL. XLVII—No. 4

April, 1921

Published by the American Society of Civil Engineers at its Headquarters,
33 West Thirty-ninth Street, New York, the Fourth Wednesday
of each Month, except June and July.

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Entered as Second-Class Matter, December 14th, 1896, at the Post Office
at New York, N. Y., under the Act of March 3d, 1879.
Acceptance for mailing at special rate of postage provided for in Section 1103,
Act of October 3d, 1917, authorized on July 5th, 1918.
Subscription, $8 per annum.

Vol. XLVII. APRIL, 1921. No. 4.

AMERICAN SOCIETY OF CIVIL ENGINEERS

INSTITUTED 1852

PROCEEDINGS

This Society is not responsible for any statement made or opinion expressed in its publications.

SOCIETY AFFAIRS

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MINUTES OF MEETINGS OF THE SOCIETY

April 6th, 1921.—The meeting was called to order at 8.00 P. M.; President George S. Webster in the chair; J. P. J. Williams, Assoc. M. Am. Soc. C. E., acting as Secretary; and present, also, 725 members and guests, of whom a large proportion were ladies.

The minutes of the meeting of March 2d, 1921, were approved as printed in *Proceedings* for March, 1921.

The President introduced the speaker of the evening, Maj.-Gen. John A. Lejeune, Commandant, U. S. Marine Corps, Washington, D. C. After his description of the Battle of Meuse-Argonne, which was of absorbing interest because of the first-hand facts and personal incidents and experiences related by the speaker who was Commanding General of the Second Division of the American Expeditionary Forces, Gen. Lejeune amplified in detail the story of the battle by the use of two

films of an animated map prepared by the U. S. Signal Corps to represent the daily movements of the various divisions at the front.

President Webster expressed the appreciation of those present, and a rising vote of thanks to Gen. Lejeune for favoring the Society by consenting to address it was passed unanimously.

The election of the following candidate on March 7th, 1921, was announced:

As Members

Lloyd Aldrich, San Francisco, Cal.
Francis Kernan Baxter, Jr., Berkeley, Cal.
George Lewis Bennett, New York City
William Harris Bosier, Kansas City, Mo.
Louis Lay Calvert, New York City
Walter Sherman Lyle Cleverdon, New York City
Edward Zane Collings, Anselmo, Cal.
Allan Vinal Garratt, Holliston, Mass.
Maurice Eugene Gilmore, New York City
Brent Cooke Jacob, Cleveland, Ohio
Carl Emil Lilliestrand, Pittsfield, Mass.
Horace Whitcomb Oxnard, Topeka, Kans.
Erastus Root St. John, Binghamton, N. Y.
Paul King Sheidler, Cincinnati, Ohio
Clint Sanford Slayback, Cisco, Tex.
Willis Lothair Westcott, Cleveland, Ohio
Howard Rogers Whitney, Springfield, Mass.
Paul Clinton Whitney, Washington, D. C.

As Associate Members

Robert Eugene Adams, Atlanta, Ga.
Frederick Raymond Adelhelm, Philadelphia, Pa.
George Douglas Andrews, New Cumberland, Pa.
James Henry Archer, Clarksdale, Miss.
James Manor Baldwin, Pittsburgh, Pa.
Ethan Frank Ball, Pittsburgh, Pa.
William Henry Bauman, Hebron, Nebr.
Archer Wilsey Bedell, Mason City, Iowa
Arthur James Boase, Philadelphia, Pa.
Arthur Hussey Brown, Parris Island, S. C.
Thomas Phelps Brown, Allison Park, Pa.
John Edward Buck, Corning, Iowa
Robert Hayes Burns, Pontiac, Mich.
Clifton Harland Chadwick, New York City
Milton Earl Chamberlain, Rutherford, N. J.
Joseph Bernard Corridon, Baltimore, Md.
Fred Gaston Cunningham, Toledo, Ohio
Harold Reynolds Dean, Huntington, N. Y.
Anthony Joseph De Pace, New York City

JOHN SIMPSON DODDS, Ames, Iowa
DANIEL RAYMOND DONLEN, Omaha, Nebr.
WARREN CLARK DONNELLY, New York City
ASHBY DAWSON ESTES, Hongkong, China
CHARLES DORMAN EVANS, Shreveport, La.
HERBERT WILLIAM FERRIS, New York City
EARL HARRELL FLANNERY, Wynne, Ark.
CHARLES CLARENCE FOSTER, Shreveport, La.
PEDRO GARCIA, Lima, Peru
SCHLEY GORDY, Columbus, Ga.
ERNEST FRED GOYETTE, Springfield, Mass.
CHARLES CYRIL HALKYARD, Sandy Bay, Tasmania
ALBERT EDMUND STOCKDALE HALL, Wilmington, Del.
ROBERT MCKENZIE HARDISON, Boston, Mass.
EUGENE LEE HARSHBARGER, Dallas, Tex.
JOHN GEORGE HEFT, Santa Rosa, Cal.
REUBEN HARLAND HORTON, Philadelphia, Pa.
FRITZ WILHELM KARGE, Los Angeles, Cal.
WILSON HOMER KNOX, Cleveland, Ohio
MILTON LEON, Muskogee, Okla.
RAY CLIFFORD LIVINGSTON, Minneapolis, Minn.
CHARLES HAROLD MCCREA, St. Louis, Mo.
EDWIN CARLETON MERRILL, New Rochelle, N. Y.
ALBERT LEONARD NELSON, Omaha, Nebr.
JOSEPH HENRY PETERSON, Boston, Mass.
JOHN GREEN REAGAN, Cisco, Tex.
LAWRENCE WOOD ROBERT, JR., Atlanta, Ga.
JOHN HARVEY ROWLAND, New York City
HERBERT OSWALD SAUER, Baltimore, Md.
EDWARD CORTLANDT SNOW, Elephant Butte, N. Mex.
CHARLES ALVAH SPEARS, Oakland, Cal.
JAMES EARL WAITE, Holyrood, Kans.
DANIEL CHARLES WALSER, Pittsburgh, Pa.
EDWARD ARDIS WAUGH, Los Angeles, Cal.
THOMAS MOSS WHEAT, Detroit, Mich.
JAMES MARION WHELAN, JR., Chicago Heights, Ill.
CARL LEX WILLIFORD, Houston, Tex.

AS ASSOCIATES

WILLIAM HENRY ELLIS, East Boston, Mass.
FRANK SHEPLEY FELLOWS, Cleveland, Ohio
ERNEST CHRISTIAN HELLER, Youngstown, Ohio
EDWIN WALLACE SCHNEIDER, Washington, D. C.
HOWARD IGNATIUS SENEY, New York City

AS JUNIORS

THOMAS RINGGOLD CAMP, Dallas, Tex.
PATRICK FRANCIS CANAVAN, New York City

JEFFERSON DAVIS HARRIS, Shreveport, La.
CHIA-YUEN HOU, Pottstown, Pa.
FRANCISCO LOBOS, Rancagua, Chile
HAROLD WASHBURN MEAD, Madison, Wis.
CHARLES NELDON MORTENSON, Salt Lake City, Utah
EDWARD CAREY O'BRIEN, New York City
NORMAN PENNEY, New York City
NATHAN PODOLOFF, New York City
GEORGE ROLLO RICH, Worcester, Mass.
CHARLES FREDERICK RUFF, New Brighton, N. Y.
AUGUSTUS VICTOR SAPH, JR., Berkeley, Cal.
IRVING SIDNEY TOWSLEY, Philadelphia, Pa.
ALTUR RANGASWAMI VENKATACHARI, Royapuram, India
WILLIAM OLIN WALTER, Coffeyville, Kans.
WALTER HERBERT WEISKOPF, Philadelphia, Pa.

The transfer of the following candidates on March 7th and 8th, 1921, was announced:

FROM ASSOCIATE MEMBER TO MEMBER

GEORGE CLYDE BALDWIN, Idaho Falls, Idaho
SYLVANUS A. BECKER, Bethlehem, Pa.
FRANK PRESTON FIFER, Florence, Ala.
CHARLES LOUIS FOX, Wilkinsburg, Pa.
CARL HAMILTON FULLER, Youngstown, Ohio
IRVING VAN ARNAM HUIE, Albany, N. Y.
DONALD FRASER MCLEOD, University, Miss.
URBAN SERENUS MARSHALL, Helena, Mont.
CHARLES ARTHUR POOLE, Rochester, N. Y.
CHARLES ERNEST RAMSER, Washington, D. C.
WALTER SAMANS, Philadelphia, Pa.
FREDERICK CHARLES SCOBEY, Berkeley, Cal.
JOHN ROCKWOOD SHERMAN, Ellensburg, Wash.
MERTON ROGERS SUMNER, New York City

FROM ASSOCIATE TO MEMBER

CHARLES GRIFFITH YOUNG, New York City

FROM JUNIOR TO ASSOCIATE MEMBER

GEORGE BURRETT DAVIDSON, New York City
WILLARD FARNSWORTH DAY, Lynchburg, Va.
WILLIAM LOUIS HAVENS, Cleveland, Ohio
ARCADIUS LARS PETER JOHNSON, New York City
BYRON CASPER MCCURDY, Memphis, Tenn.
RALPH LEONARD MORRELL, Chicago, Ill.
RUSSELL ALGER VAN NESS, Chicago, Ill.

The following deaths were announced:

WILLIAM HENRY BRENTON, of Washington, D. C., elected Member, April 18th, 1916; died February 11th, 1921.

JOHN RYAN BURKE, of Boston, Mass., elected Member September 12th, 1916; died April 27th, 1920.

EUGENE WILLETT VAN COURT LUCAS, of New York City, elected Associate Member, April 3d, 1895; Member, September 5th, 1900; died March 8th, 1921.

WISNER MARTIN, of Boston, Mass., elected Junior, May 3d, 1892; Associate Member, July 3d, 1895; Member, May 1st, 1901; died May 24th, 1919.

BERNHARD MARTIN SAMUELSON, of London, England, elected Member, March 11th, 1919; died February 20th, 1921.

CALVIN TOMKINS, of New York City, elected Associate, January 6th, 1886; died March 13th, 1921.

Adjourned.

OF THE BOARD OF DIRECTION

(Abstract)

March 7th, 1921.—The Board reconvened at 10 A. M., at the Headquarters of the Society; President Webster in the chair; H. S. Crocker, Acting Secretary; and present, also, Messrs. Anderson, Beahan, Brown, Clark, Curtis, Davis, Elwell, Greene, Grunsky, Henny, Herschel, Hogan, Hovey, Hoyt, Hudson, Humphrey, Langthorn, Marston, Pegram, Stuart, Talbot, and Wall.

After certain minor corrections were made, the minutes of the meetings of the Board of January 17th and 18th, 1921, and of the sessions of January 19th and 20th, 1921, of the present meeting were, on motion of Director Humphrey, seconded by Past-President Herschel, unanimously approved.

The President appointed Vice-President Wall and Director Anderson as Tellers to canvass the Membership Ballot. The Tellers subsequently reported, and the President declared the election of candidates.*

REPORT OF FINANCE COMMITTEE.

Past-President Herschel, Chairman of the Finance Committee, presented a report of date March 7th, 1921, excerpts from which follow.

"MARCH 7TH, 1921.

"The Finance Committee met on February 24th, 1921, this being the only meeting which it has had since the January 17th, 1921, Board meeting.

"Consideration was had of the action taken at the January 17th, 1921, Board meeting in accepting a report from the Committee on Special Committees and approving its recommendation that an appropriation of $3 000 be made for the work of the Special Committee on Bridge Design and Construction for the year 1921, subject to the approval of the Finance Committee.

"The Finance Committee approved this appropriation.

"Consideration was had of the request for an additional appropriation of $1 250 for the Library of the United Engineering Society, and it was decided to recommend that that amount be added to the budget appropriation.

"Consideration was had of the letter from Chairman Cummings of the Special Committee on Bearing Value of Soils for Foundations, and on motion, duly sec-

* See page 374.

onded, it was decided to refer this matter to the Committee on Special Committees for report to the Board.

"Referring to the receipt from the *Engineering News-Record* of $2 000, its contribution to the Arthur M. Wellington Prize Fund, recommendation is made that this shall be invested in U. S. Fourth Liberty Loan Bonds, having an interest rate of 4¼, which bonds are now quoted at 87, making a net dividend of approximately 5.4%."

On motion of Director Clark, duly seconded and carried, the report was approved.

Past-President Davis moved a reconsideration. This motion was seconded by Past-President Herschel and was unanimously carried.

Directors Humphrey and Anderson discussed the recommendation of the Finance Committee regarding the acceptance of resignations as set forth in the report, and on motion of Director Humphrey, seconded by Director Hudson, the several names were ordered to be referred to the Directors in their several districts for subsequent report to the Board.

All other recommendations contained in the report of the Finance Committee were adopted and made the action of the Board.

Committees Report Progress.

Director Humphrey made a progress report for the Publication Committee.

In accordance with the authorization of the Board, on account of Chairman Hunt's absence from the city, President Webster subsequently appointed Director Humphrey Acting Chairman of the Publication Committee.

Vice-President Stuart, Chairman of the Library Committee, reported progress.

Past-President Davis, Chairman of the Committee on Special Committees, reported progress.

Action Regarding Committee on Electrification of Railroads.

Consideration was had of the report of the 1920 Committee on Special Committees on the subject of the advisability of appointing a committee to investigate the question of electrification of steam railways.

The subject was discussed by Director Humphrey, Past-Presidents Talbot and Davis, Directors Marston and Hoyt, and Past-President Curtis.

Director Humphrey moved that the committee be not appointed, the sense of the Board being that the facts in the case do not seem to warrant its appointment.

This motion was seconded, and carried unanimously.

Discussion of the subject was resumed by Director Hoyt and Past-Presidents Curtis, Davis and Pegram, following which Director Hoyt moved that the Committee on Special Committees be instructed to investigate this question and take the matter up with other Societies to see in what way this Society can co-operate with other Societies in this direction.

This motion was seconded by Past-President Pegram, and unanimously carried.

Plan for Conducting Technical Activities.

Director Hoyt referred to a suggested plan for conducting the technical activities of the Society which he had previously communicated under date of February 4th, 1921, severally to the members of the Board, as follows:

"With a view to increasing the value of the technical activities of the American Society of Civil Engineers, it is suggested that the field of civil engineering be divided into several branches (for example, sanitary, hydraulic, structural, topographic, highway, railroad, irrigation, drainage, river and harbor improvement), and that a committee be appointed to follow the work in each branch, such committee to be composed of men who are active in the branch. Following are possible functions of each such committee:

"1.—To keep in touch with the work that is being done throughout the country in its branch.

"2.—To advise the membership in a general way, through the *Proceedings,* of activities in its branch.

"3.—To solicit papers for presentation to the Society, and to promote discussions of them to the end that the Society publications may contain a record of important current activities in engineering, as well as a history of completed engineering work.

"4.—To keep sufficiently in touch with the activities of other organizations that our work may be co-ordinated with others and duplication avoided.

"5.—To initiate the organization of sub-committees for work within limited fields in the branch if there is demand for them.

"6.—To assist the Committee on Publications, especially by reviewing manuscripts submitted for presentation, or to suggest names for this function.

"7.—To study systematically the needs for sub-committees on research problems in the branch and to make appropriate recommendations to the Board of Direction.

"The above plan of procedure should tend to create an interest by the individual members of the Society in its work, and the committees could be composed of the younger men located in various parts of the country. It could also be extended to promote activities in the Local Sections, and might eventually lead to the formation of technical sections."

This plan and the general subject were discussed in detail by Messrs. Anderson, Davis, Hoyt, Humphrey, Stuart, Talbot, and Webster; Vice-President Stuart moved that the Committee on Special Committees, for the purpose of expanding the technical activities of the Society, shall consider the organization of a committee on technical affairs, and shall make recommendation to the Board of the number of members of which such committee should be comprised.

This motion was seconded by Director Beahan and discussed by Messrs. Anderson, Beahan, Davis, Hoyt, Humphrey, and Stuart, after which it was unanimously carried.

The Committee on Special Committees later made the following report:

COMMITTEE TO PROMOTE TECHNICAL ACTIVITIES.

"The Board of Direction has referred to the Committee on Special Committees the suggestions of Director Hoyt concerning the appointment of a Committee to Promote the Technical Interests and Activities of the Society.

"After discussion and consideration, the Committee begs to submit the following report:

"It is suggested that a Committee of seven be appointed, consisting of Corporate Members, widely distributed geographically and representing different branches of civil engineering, whose duties shall be to stimulate interest and activities in technical lines.

"This Committee should be empowered to select and recommend to the Board of Direction for appointment a sub-committee in each Director's district for the purpose of stimulating discussion and authorship of technical subjects of interest to our membership, and to see that the latest developments along the various lines of engineering are promptly given to the public by those best qualified to do so.

"The main Committee should supervise the work of the sub-committees, see that they function properly, and recommend changes in the personnel thereof when deemed necessary.

"The main Committee should conduct most of its work by correspondence, but shall receive mileage allowance for not more than two meetings per year.

"No mileage shall be allowed the sub-committees except as shall be especially provided by the Board or by Local Sections in their several localities."

On motion of Director Henny, seconded by Director Beahan, this report was approved, and the President was authorized to appoint the members of the Committee requested.

Recess was taken until 2 P. M.

AFTERNOON SESSION.

The Board reconvened at 2 P. M., with the same attendance as in the morning.

CONSIDERATION OF EXTERNAL RELATIONS POSTPONED.

Consideration was had of the action of the Board of Direction at its meeting of January 17th, 1921, in recommending that at its Quarterly Meetings the Board sit as a Committee of the whole on matters touching on external relations of the Society, and that it appoint in such centers or districts as may appear to it desirable local committees to act under the chairmanship of the member of the Board of Direction of the district, in order that the work of the Committee and of the Society may be properly co-ordinated without undue expense to the Society.

This matter was discussed by Messrs. Humphrey, Stuart, Talbot, and Wall.

On motion of Vice-President Stuart, seconded by Director Humphrey, and duly carried, action was deferred until after the Annual Convention.

ACTION REGARDING PROPOSED NEW CONSTITUTION.

On motion of Director Humphrey, action was taken in authorizing the Acting Secretary to transmit to the Corporate Membership, in connection with the new Constitution proposed by the Committee on Referred Amendments, the report of that Committee of date of February 17th, 1921; the Committee's comments concerning the various changes which it proposes in the Constitution; and a letter from Messrs. Parker and Aaron, of date of February 18th, 1921, concerning the legality of the proposed revision of the Constitution.

A general discussion was had of the report of the Committee on Referred Amendments, and action was taken instructing the Acting Secretary to decline the request of the Committee that its comments on the several articles of the proposed Constitution be printed in parallel columns opposite the articles to which they refer, and he was further instructed to communicate to the Committee the latest action of the Board of Direction in the adoption of rules governing the organization and administration of Student Chapters.

Director Henny moved that the President appoint a committee to co-operate with the Committee which has submitted these amendments, to go over all the contradictory points and changes so that there may be a thorough amendment to this present amendment ready for consideration at the Annual Convention.

This motion was seconded by Past-President Herschel and discussed by Messrs. Anderson, Henny, Hogan, Humphrey, Marston, and Webster, and as the result of an "aye" and "no" vote was declared lost.

Reimbursement of Chairman of Engineering Council.

The Acting Secretary recited the history of the underwriting to the amount of $25 000 by Mr. J. Parke Channing of certain activities of Engineering Council.

On motion of Director Grunsky, seconded by Past-President Talbot, appropriation was made of the sum of $2 750 to reimburse Mr. Channing for the Society's share of the amount due him in final settlement of the account.

Future Meetings of the Board.

On motion of Director Humphrey, seconded by Past-President Davis, action was taken in fixing the following tentative dates for future meetings of the Board in the year 1921, these dates being subject to positive determination at the session of this meeting immediately prior to the Annual Convention; Quarterly Meetings, July 11th and October 10th, 1921; Intermediate Meetings, June 6th, September 12th, and November 21st, 1921.

Action to Appoint Members on Library Board of United Engineering Society.

The Acting Secretary presented for consideration the following letter:

"Hamilton Hotel, Hamilton, Bermuda,
"January 21st, 1921.

"Mr. George S. Webster,
"President, Am. Soc. C. E.,
"4900 Penn Street, Frankford,
"Philadelphia, Pa.

"Mr. Webster.—I am writing this letter on account of leaving for a trip to-morrow morning, and will be unable to discuss the subject with you, but the purpose is to direct your attention to the contract agreement between the American Society of Civil Engineers and United Engineering Society relative to the Library, and is referred to in the Charter and By-laws, Third Revision, May, 1917, page 27. Under the second paragraph, I quote as follows:

"'2d. The four libraries of the said societies shall be controlled and administered as one Joint Library by the Library Board of the United Engineering Society, in accordance with the By-laws of that Society.'

"This clause of the agreement when interpreted in terms of its obligations to accord with the By-laws of the United Engineering Society means that our Society shall designate one member of the Society each year to serve four years on the Library Board, and if you are to maintain the continuity of interest and influence and control of the affairs of the Library Board, I take the liberty of suggesting to you that the requirements of this clause shall be carried out. I also feel just as keenly that the practice of appointing as our Committee the representatives of the Society on the Library Board works a great disadvantage, not only to the Library Board, but to our own Society particularly. As far as I can find there is no justification for such appointments. The Library Committee and the Board of Direction are separate and apart from the Library Board, and its constitutional duties do not require it to participate in the affairs of the Library Board. On the other hand, the appointments to the Library Board are equally as important as those to Engineering Foundation, and it would be advantageous to select men of equal standing.

"I trust you will pardon my liberty in directing attention to this, particularly on account of the delicacy of my relations to the enterprise, but assure you of the impersonal character of the reference.

"Yours very truly,
"Robert A. Cummings,
"*Vice-President,* Am. Soc. C. E."

and in this connection consideration was had of the By-laws of the United Engineering Society as follows:

"85.—The Library Board shall be composed as follows: Four members designated by each of the Founder Societies; the Secretary of each of the Founder Societies; the Director of the Library, who shall also be the Secretary of the Board.

"One member shall be designated by each Founder Society each year to serve four years.

"Any vacancy occurring among the appointed members shall be filled by the corresponding Founder Society for the unexpired term."

Past-President Talbot moved that the Board proceed to carry out the provision of the By-laws of the United Engineering Society in regard to the Library Board, and that the President be authorized to appoint representatives of this Society as members of the Library Board for terms of four, three, and two years, respectively, and one member for a term of one year.

Director Humphrey seconded this motion, and it was duly carried.

Delegates to General Engineering Congress in London Authorized.

The Acting Secretary presented a letter* from the Secretary of the Institution of Civil Engineers, London, England, extending a cordial invitation to members of this Society to attend a General Engineering Congress, to be held in London during the summer of 1921; also a letter from the American Society of Mechanical Engineers indicating its intention to send delegates to the Engineering Conference in question; and a suggested list of delegates from the other three Founder Societies.

Director Humphrey moved, and Past-President Talbot seconded the motion, which was duly carried, that the President be empowered to select three or more members of the Society as representatives to attend the Conference at their own expense.

Conference Committee on Universal Code of Ethics.

The Acting Secretary referred to the appointment by the previous Board of a Committee of two of its members to co-operate with a like committee of Mechanical Engineers with a view to the development of an universal Code of Ethics applicable to all engineers and architects, and called attention to its recommendation that the present Board appoint a new committee to go on with the work.

On motion of Director Humphrey, seconded by Director Beahan, and unanimously carried, the President was authorized to appoint a committee of two members of the Board.

The President subsequently appointed Messrs. A. M. Hunt and C. C. Elwell.

Proposed Revival of Special Committee on Valuation.

The Acting Secretary presented a letter from R. S. Buck, M. Am. Soc. C. E., suggesting the revival of the Special Committee on Valuation of Public Utilities.

Director Grunsky moved the matter be referred to the Committee on Special Committees for recommendation to the Board.

This motion was seconded by Director Humphrey and carried unanimously.

* This letter was published in Items of Interest, *Proceedings*, Am. Soc. C. E., January, 1921, p. 5.

Committee on Education Proposed.

A communication of date of March 5th, 1921, from Secretary Flinn in regard to the proposed investigation of industrial education and training by Engineering Foundation, and suggesting that the Society should have a Committee on Education to which matters in this connection may be referred was, on motion of Director Grunsky, duly seconded and carried, referred to the Committee on Special Committees for recommendation.

Delegates and Representatives Appointed.

In response to an invitation of the American Academy of Political and Social Science, the President was authorized to appoint three delegates to its Twenty-fifth Annual Meeting to be held May 13th and 14th, 1921, in Philadelphia, Pa., with the understanding that the attendance of these delegates shall not involve the Society in any expense.

The President subsequently appointed Messrs. William Easby, Jr., Benjamin Franklin, and John Meigs, Members, Am. Soc. C. E.

Past-President Charles D. Marx was re-appointed representative of the Society on the Washington Award Commission.

The Acting Secretary reported the following as a matter of record:

Appointment by President Webster of Robert I. Randolph, M. Am. Soc. C. E., as representative of the Society to the National Construction Conference held in Chicago, Ill., on March 2d and 3d, 1921.

Appointment by President Webster of George G. Anderson, Chairman, Edward E. Wall, and Frank T. Darrow, as a Committee of the Board; and of E. B. Cushing, Chairman, J. H. Brillhart, J. M. Howe, H. F. Jonas, E. G. Maclay, J. C. McVea, E. E. Sands and M. J. Sullivan as the Local Committee on Arrangements for the Annual Convention.

The receipt of invitations from the Mayor of Buffalo, N. Y., and from the Buffalo Chamber of Commerce to hold the 1921 Annual Convention in that city, together with his reply explaining the impossibility of acceptance.

The award by the Institution of Civil Engineers to Dr. W. C. Unwin of the Kelvin Medal of 1920.

The acceptance by Joseph J. Yates, M. Am. Soc. C. E., of his appointment as representative of the Society on the American Engineering Standards Committee for the term ending December 31st, 1923, and action was taken in the appointment of H. N. Latey, M. Am. Soc. C. E., as an alternative representative to this Committee.

The acceptance by S. F. Holtzman, M. Am. Soc. C. E., of his appointment as representative of the Society on the Sectional Committee for the Standardization of Elevators of the American Engineering Standards Committee.

The acceptance by G. R. Solomon, M. Am. Soc. C. E., of his appointment as representative of the Society on the Sectional Committee on Safety of Floor Openings, Railings and Toe Boards of the American Engineering Standards Committee.

The compliance of the Nashville Section with the conditions of organization prescribed by the Board.

Publication of Papers—New Student Chapters.

Certain resolutions* passed by the Portland Section relative to the form of publication of papers, were referred to the Publication Committee, with the request that report be made at the next meeting of the Board.

* See page 413.

Approval was given to the establishment of the following Student Chapters:

The Alabama Polytechnic Institute Student Chapter,
The Johns Hopkins University Student Chapter,
The University of Kansas Student Chapter,
The Massachusetts Institute of Technology Student Chapter,
The New York University Student Chapter,
The Polytechnic Institute of Brooklyn Student Chapter,
The Purdue University Student Chapter,
The Rose Polytechnic Institute Student Chapter,
The Virginia Military Institute Student Chapter,
The Yale University Student Chapter.

On motion of Director Marston, duly seconded, and carried, the report of the Committee on Student Chapters, which was received and adopted at the January 18th, 1921, Board meeting, was revised to authorize the form of membership card already in use prior to the report.

Action was taken instructing the Secretary in June of each year to communicate with the members of Engineering Departments of colleges and universities at which Student Chapters are established, calling attention to the advantages to be derived by engineering graduates becoming Juniors of the Society.

Recess was taken at 5:45 P. M., to meet as a Membership Committee, on March 8th, 1921, at 9 A. M.

March 8th, 1921.—The Board reconvened at 2:45 P. M., at the conclusion of the meeting of the Membership Committee, and the report of that Committee was presented.

On motion, duly seconded, the recommendations of this report, which were not read, were adopted as the action of the Board.

REPORT OF SPECIAL COMMITTEE ON RESEARCH.

Past-President Talbot, Chairman of the Special Committee on Research, offered the following report:

"MARCH 8TH, 1921.

"TO THE BOARD OF DIRECTION,
"AMERICAN SOCIETY OF CIVIL ENGINEERS.

"The Committee which was asked to report further on the scope of work of the Committee on Research and the Advisory Committee on Civil Engineering of the Division of Engineering of the National Research Council, makes the following report, and proposes the following statement of duties of these Committees:

"The duties of the Committee on Research (to consist of seven or nine members) shall be to organize, stimulate, and supervise the research work of the Society as conducted by its Committees or through co-operation with societies and individuals, in accordance with the directions and regulations of the Board of Direction.

"The duties of the representatives of the Society on the Advisory Committee on Civil Engineering of the Division of Engineering of the National Research Council shall be to represent the Society in its responsibilities therein as Sponsor Society in research work in civil engineering, in accordance with the directions and regulations of the Board of Direction. The representatives of this Society on this Advisory Committee shall be not more than fifteen, and shall include the Committee on Research of the Society.

"The Committee asks further time to make recommendations on the personnel of these Committees.

"Respectfully submitted,

"A. N. TALBOT, *Chairman,* "GEORGE H. PEGRAM,
"A. P. DAVIS, "ROBERT A. CUMMINGS,
"ANSON MARSTON, "H. S. CROCKER."

On motion of Director Humphrey, seconded by Director Beahan, and unanimously carried, the report was accepted, and action taken on the several recommendations as follows:

Director Humphrey moved that the recommendation first read be approved. The motion was seconded by Vice-President Wall and unanimously carried.

Past-President Talbot and Director Humphrey debated the second recommendation, following which Director Humphrey moved its approval. This motion was seconded by Past-President Davis and unanimously carried.

WAR DEPARTMENT AND CIVILIAN ENGINEERS.

Past-President Davis presented a communication from A. B. McGrew, M. Am. Soc. C. E., proposing a draft of preamble and resolutions concerning the policy of the War Department in the employment of civilian engineers in the prosecution of river and harbor and other civil works.

These resolutions were discussed by Messrs. Cummings, Davis, Grunsky, Henny, Humphrey, and Talbot, and certain revisions and changes were made in their original phraseology, leading to the final presentation of the following resolutions, the adoption of which was moved by Past-President Davis and seconded by Past-President Talbot:

"Whereas, it has heretofore been the policy of the War Department to employ civilian engineers in the prosecution of river and harbor and other civil works, and,

"Whereas, a number of these, who have served for from twenty to more than forty years, have attained to a high standard of efficiency in all matters relating to such Government works, and because of their thorough knowledge of the works and affairs in general pertaining to their localities have for many years been charged with the major responsibilities of the districts in which they are employed, and,

"Whereas, during the period of the war many of the important Engineer Districts for rivers and harbors were placed in complete charge of such civilian engineers, for which specific provision of law exists, in which capacity they served, as heretofore, devotedly and with distinction, and,

"Whereas, at the close of the war period these civilians were promptly relieved of their posts and restored to their former positions without material recognition of their devoted and patriotic services, for which they could readily at the time have derived a much higher compensation in private life, and,

"Whereas, under the provisions of the Army Reorganization Act of June 5th, 1920, the War Department has been and is now commissioning civil engineers into the Army, many without important or extensive experience in river and harbor and other civil works, and is appointing these newly made officers in its Engineer Bureau to the charge of districts over its efficient, faithful, civilian employees of long standing, therefore be it

"Resolved: That the Board of Direction of the American Society of Civil Engineers calls the attention of the representatives in Congress to the manifest unfairness and injustice and undemocratic and unbusinesslike discrimination apparent in the appointment of engineers in charge of the Government's engineering works, and urges that Congress speedily proceed, by proper enactment, to recognize the services rendered by those civilian engineers who at any time during

the World War served meritoriously as District Engineers in charge of River and Harbor Districts, by creating the office of United States Civil Engineer and designating said ex-District Engineers as such United States Civil Engineers; said Congressional enactment to fix the salary, retirement provision, and other conditions and allowances, similar to those proposed in Senate Bill 4 956, 66th Congress, 3d Session, introduced on January 31st, 1921, by Senator Wolcott of Delaware, and be it

Resolved: That a copy of these resolutions be transmitted to the Secretary of War, the Chairmen of the Senate and the House Military Committees, the Chairman of the Senate Committee on Commerce, and the Floor Leader of the House."

Director Humphrey moved that action be deferred until the session of April 25th, 1921.

After being seconded, this motion was lost by show of hands, by a vote of 7 "ayes" to 11 "noes".

Action was then taken on the resolutions, which were unanimously carried.

At the request of Director Humphrey for an expression of views of the members of the Board regarding the method of publishing papers which are presented to the Society, Messrs. Davis, Marston, Grunsky, Henny, Humphrey, and Talbot participated in an informal discussion, no action being taken.

Recess was taken until 10 A. M., April 25th, 1921, at Houston, Tex.

SELECTED LIST OF BOOKS ON CIVIL ENGINEERING

Compiled by the Acting Secretary under the Direction of the Committee on Publications*

This list is issued in the hope that it may be helpful to engineers and to libraries in making a reference collection of books on Civil Engineering. It is not to be regarded as a comprehensive list, as the intention has been to include only the more important books in each branch. In the work of selection the Committee has been assisted by many prominent engineers.

The Committee on Publications will welcome further suggestions from the membership at large. Members sending suggestions will please bear in mind:

1. The list is not intended to be comprehensive.
2. It should be condensed rather than enlarged, and suggestions should be made for substitutions rather than additions, but
3. All branches of Civil Engineering should be represented adequately, and note of omissions of subjects or the more important books on the subject should be made.

It is hoped that a list may be evolved which, representing the consensus of opinion of members of this Society on the subject, may be authoritative although it is realized that no list will ever be approved in its entirety by every one.

ENGINEERING IN GENERAL.

Bibliographies.

Engineering Index. 1884–1920. N. Y., Am. Soc. Mech. Engrs.
Industrial Arts Index. 1913–20. N. Y., H. W. Wilson Co.

Biography.

Smiles, Samuel. Lives of the engineers. New ed. 5 v. 1905. N. Y., Scribner, $13.75.

Contracts and Specifications. Law.

Allen, C. Frank. Business law for engineers. 1917. N. Y., McGraw, $4.
Johnson, John Butler. Engineering contracts and specifications. Ed. 3. 1902. N. Y., McGraw, $3.
Mead, D. W. Contracts, specifications and engineering relations. Ed. 2. 1920. N. Y., McGraw, $4.
Wait, John Cassan. Engineering and architectural jurisprudence. 1898. N. Y., Wiley, $6.
Wait, John Cassan. Law of contracts. 1901. N. Y., Wiley, $2.75.
Wait, John Cassan. Law of operations preliminary to construction in engineering and architecture. 1900. N. Y., Wiley, $5.

Dictionaries.

Schlomann, Alfred, ed. Illustrated technical dictionary in six languages. 13 v. 1906–19 N. Y., Stechert, prices of separate volumes range from $2 to $7.

General Works.

Handbuch der Ingenieur-Wissenschaften. 61 v. 1880–1914. Leipzig, Engelmann.
Carpenter, R. C. Experimental engineering. Ed. 7. 1911. N. Y., Wiley, $6.

Handbooks.

Dawson, Philip. "Engineering" and electric traction pocket-book. Ed. 4. 1906. N. Y., Wiley, $5.
Frye, Albert I. Civil engineers' pocket-book. 1913. N. Y., Van Nostrand, $5.
Kent, William. Mechanical engineers' pocket-book. Ed. 9. 1916. N. Y., Wiley, $6.
Kidder, Frank E. and Thomas Nolan, eds. Architects' and builders' pocket-book. Ed. 16. 1916. N. Y., Wiley, $6.
Marks, Lionel S., ed. Mechanical engineers' handbook. 1916. N. Y., McGraw, $7.
Merriman, Mansfield. American civil engineers' handbook. Ed. 4. 1920. N. Y., Wiley, $5.
Peele, Robert. Mining engineers' handbook. 1918. N. Y., Wiley, $6.
Pender, Harold, ed. American handbook for electrical engineers. 1914. N. Y., Wiley, $6.
Trautwine, J. C. Civil engineers' pocket-book. Ed. 20. 1919. Phil., Trautwine, $6.

* This list is based on one prepared for the Los Angeles Section by Eleanor H. Frick and Edith L. Shearer formerly Librarian and Assistant Librarian, respectively, of the American Society of Civil Engineers.

Valuation.

Floy, Henry. Valuation of public utility properties. 1912. N. Y., McGraw, $5.
Floy, Henry. Value for rate-making. 1916. N. Y., McGraw, $4.
Foster, H. A. Engineering valuation of public utilities and factories. 1912. N. Y., Van Nostrand, $3.
Grunsky, C. E. Valuation, depreciation and the rate base. 1917. N. Y., Wiley, $4.
Hayes, Hammond V. Public utilities: their cost new and depreciation. Ed. 2. 1916. N. Y., Van Nostrand, $2.
Hayes, Hammond V. Public utilities; their fair present value and return. 1915. N. Y., Van Nostrand, $2.
Saliers, Earl A. Principles of depreciation. 1915. N. Y., Ronald Press Co., $2.50.
Whitten, Robert H. Valuation of public service corporations. 1912. N. Y., Banks Law Pub. Co., $5.50.
Whitten, Robert H. Supplement of above. 1914. N. Y., Banks Law Pub. Co., $5.50.

CONSTRUCTION IN GENERAL. MANAGEMENT.

Efficiency Engineering. Management.

Babcock, G. D. Taylor system in Franklin management. 1918. N. Y., Eng. Mag. Co., $3.
Kimball, D. S. Principles of industrial organization. Ed. 2. 1919. N. Y., McGraw, $3.
Merrick, Dwight V. Time studies as a basis for rate setting. 1919. N. Y., Eng. Mag. Co., $6.
Taylor, Frederick W. Shop management. Rev. ed. 1911. N. Y., Harper, $1.50.
Thompson, Clarence Bertrand, ed. Scientific management. 1914. Cambridge, Mass., Harvard Univ. Press, $4.

Contractors' Plant.

Dana, Richard T. Handbook of construction plant, its cost and efficiency. 1914. N. Y., McGraw, $6.

Construction Work. Contracting.

Hauer, D. J. Modern management applied to construction. 1918. N. Y., McGraw, $2.50.

Costs.

Gillette, H. P. Handbook of cost data. Ed. 2. 1910. N. Y., McGraw, $6.
Gillette, H. P. and Richard T. Dana. Handbook of mechanical and electrical cost data. 1918. N. Y., McGraw, $6.

Drawing. Graphic Charts. Drafting Room.

Bartlett, F. W. and T. W. Johnson. Engineering descriptive geometry and drawing. 1919. N. Y., Wiley, $5.50.
Bishop, C. T. Structural drafting and the design of details. 1920. N. Y., Wiley, $5.
Collins, C. D. Drafting room methods, standards and forms. 1918. N. Y., Van Nostrand, $2.
French, T. E. Manual of engineering drawing. Ed. 2. 1918. N. Y., McGraw, $3.
Haskell, A. C. How to make and use graphic charts. 1919. N. Y., Codex Book Co., $5.
Peddle, J. B. Construction of graphical charts. Ed. 2. 1919. N. Y., McGraw, $2.

Engineering Geology.

Ries, Heinrich and Thomas L. Watson. Engineering geology. Ed. 2. 1914. N. Y., Wiley, $4.

Earthwork. Excavation Clearing.

Baker, *Sir* Benjamin. Actual lateral pressure of earthwork. (Van Nostrand science series). 1881. N. Y., Van Nostrand, 50c.
Daw, Albert W. Blasting of rock in mines, quarries, tunnels, etc. Ed. 2. 1909. N. Y., Spon, $5.
Gillette, H. P. Earthwork and its cost, a handbook of earth excavation. Ed. 3. 1920. N. Y., McGraw, $6.
Gillette, H. P. Handbook of clearing and grubbing methods and cost. 1917. N. Y., McGraw, $2.50.
Gillette, H. P. Handbook of rock excavation, methods and cost. 1916. N. Y., McGraw, $6.
McDaniel, Allen Boyer. Excavation machinery, methods and costs. 1919. N. Y., McGraw, $5.
Wellington, Arthur M. Methods for the computation from diagrams of preliminary and final estimates for railroad earthwork. 1875. N. Y., Appleton.

Waterproofing.

Ross, Joseph. Waterproof engineering. 1919. N. Y., Wiley, $5.

MATERIALS OF ENGINEERING.

Handbooks.

Johnson, J. B. Materials of construction. Ed. 5. 1918. N. Y., Wiley, $6.
Moore, H. F. Textbook of the materials of engineering. Ed. 2. 1920. N. Y., McGraw, $3.

Laboratory Manuals.

Hatt, W. K. and H. H. Scofield. Laboratory manual of testing materials. Ed. 2. 1920. N. Y., McGraw, $2.

Cement and Concrete

Blount, B. and others. Cement. 1920. London, Longmans, $6.
Butler, D. B. Portland cement, its manufacture, testing and use. Ed. 2. 1905. N. Y., Spon, $4.50.

Eckel, Edwin C. Cements, limes and plasters. 1905. N. Y., Wiley, $6.
Falk, Myron S. Cements, mortars and concretes. 1904. N. Y., McGraw, $2.50.
Gillmore, Q. A. Treatise on limes, hydraulic cements and mortars. 1886. N. Y., Van Nostrand, $4.
Heath, A. H. Manual on lime and cement. 1893. N. Y., Spon.
Le Chatelier, Henri. Constitution of hydraulic mortars. 1905. N. Y., McGraw, $2.
Sabin, L. C. Cement and concrete. Ed. 2. 1907. N. Y., McGraw, $5.
Taylor, W. Purves. Practical cement testing. 1908. N. Y., McGraw, $3.

Iron and Steel.

Cambria Steel Co. Cambria steel, a handbook of information relating to structural steel manufactured by the Cambria Steel Co.; comp. by George E. Thackray. Ed. 12. 1919. Johnstown, Pa., Cambria Steel Co., $1.50.
Camp, J. M. and C. B. Francis. Making, shaping and treating of steel. Ed. 2. 1920. Pittsburgh, Carnegie Steel Co., $5.
Campbell, H. H. Manufacture and properties of iron and steel. Ed. 4. 1907. N. Y., McGraw, $6.
Carnegie Steel Co. Shape book containing profiles, tables, and data appertaining to the shapes, plates, bars, rails and track accessories manufactured by Carnegie Steel Company. Ed. 7. 1920. Pittsburgh, Carnegie Steel Co., $1.
Cushman, Allerton S. and H. A. Gardner. Corrosion and preservation of iron and steel. 1910. N. Y., McGraw, $5.
Elliott, T. J. Elliott's weights of steel for engineers. 1916. Cleveland, Penton Publishing Co., $20.
Friend, J. Newton. Corrosion of iron and steel. 1911. N. Y., Longmans, $1.80.
Stoughton, Bradley. Metallurgy of iron and steel. Ed. 2. 1911. N. Y., McGraw, $4.
Tiemann, H. P. Iron and steel. Ed. 2. 1919. N. Y., McGraw, $4.
Wood, M. P. Rustless coatings. 1904. N. Y., Wiley, $4.

Stone and Clays.

Eckel, Edwin C. Building stones and clays. 1912. N. Y., Wiley, $3.
Richardson, Charles Henry. Building stones and clays. 1917. Syracuse, N. Y., Syracuse Univ., $5.50.

Timber.

Betts, H. S. Timber, its strength, seasoning and grading. 1919. N. Y., McGraw, $3.
Goss, O. P. M. Structural timber handbook on Pacific coast woods. 1916. Seattle, West Coast Lumbermen's Assoc., $1.
Tiemann, H. D. Kiln drying of lumber. 1917. Phil., Lippincott, $4.
Snow, Charles Henry. Wood and other organic structural materials. 1917. N. Y., McGraw, $5.
Weiss, Howard F. Preservation of structural timber. Ed. 2. 1916. N. Y., McGraw, $3.50.

CIVIL ENGINEERING.

General Works.

Mahan, D. H. Treatise on civil engineering. 1888. N. Y., Wiley.
Rankine, W. J. M. Manual of civil engineering. Ed. 24. 1920 (?). London, Griffin, 6s.

Structural Engineering. Mechanics of Materials. Theory of Design. Bridges.

Bach, Carl. Elastizität und Festigkeit. Ed. 6. 1911. Berlin, Springer, 20M.
Burr, W. H. Elasticity and resistance of the materials of engineering. Ed. 7. 1915. N. Y., Wiley, $5.50.
Church, I. P. Mechanics of engineering. Rev. ed. 1908. N. Y., Wiley, $6.
Dilworth, E. C. Steel railway bridges, designs and weights. 1916. N. Y., Van Nostrand, $6.
Hudson, C. W. Deflections and statically indeterminate stresses. 1911. N. Y., Wiley, $3 50.
Johnson, J. B. Theory and practice of modern framed structures. Ed. 9. 3 v. 1911–13. N. Y., Wiley, $11.
Ketchum, Milo S. Design of highway bridges of steel, timber and concrete. Ed. 2. 1920. N. Y., McGraw, $6.
Ketchum, Milo S. Structural engineers' handbook. Ed. 2. 1918. N. Y., McGraw, $6.
Kunz, F. C. Design of steel bridges. 1915. N. Y., McGraw, $6.
Marburg, Edgar. Framed structures and girders. v. 1. Stresses. 1911. N. Y., McGraw, $5.
Merriman, Mansfield. Mechanics of materials. Ed. 11. 1914. N. Y., Wiley, $4.
Merriman, Mansfield and H. S. Jacoby. Text-book on roofs and bridges. Pts. 1–4. 1905–17. N. Y., Wiley, $2.50 each.
Morley, A. Theory of structures. New ed. 1918. London, Longmans, $4.75.
Morris, Clyde T. Designing and detailing of simple steel structures. Ed. 3. 1914. N. Y., McGraw, $2.50.
Müller-Breslau, H. F. Elementares—Handbuch des Festigkeitslehre. 1875. Berlin Seydel.
Müller-Breslau, H. F. Die neuren Methoden der Festigkeitslehre und der Statik der Baukonstruktionen. Ed. 4. 1913. Leipzig, Kröner, 12M.
Rankine, W. J. M. Manual of applied mechanics. Ed. 20. 1919. London, Griffin, 12s. 6d.
Spofford, C. M. Theory of structures. Ed. 2. 1915. N. Y., McGraw, $5.
Tyrrell, H. G. Artistic bridge design. 1912. N. Y., McGraw, $3.
Waddell, J. A. L. Bridge engineering. 2 v. 1916. N. Y., Wiley, $10.

Concrete and Reinforced Concrete Construction.

Buel, A. W. and C. S. Hill. Reinforced concrete. Ed. 2. 1906. N. Y., McGraw, $6.
Corrugated Bar Co. Useful data on reinforced concrete buildings for the designer and estimator. 1919. Buffalo, N. Y., Corrugated Bar Co., $2.50.
Eddy, H. T. and C. A. P. Turner. Concrete steel construction. Ed. 2. 1919. Minneapolis, C. A. P. Turner Co., $10.

Emperger, F., *Edler* von, ed. Handbuch für Eisenbetonbau. Ed. 2. 12 v. 1910–15. Berlin, Ernst.
Gillette, H. P. and C. S. Hill. Concrete construction, methods and cost. 1908. N. Y., McGraw, $5.
Hool, G. A. and N. C. Johnson. Concrete engineers' handbook. 1918. N. Y., McGraw, $6.
Hool, G. A. Reinforced concrete construction. Ed. 2. 3 v. 1918. N. Y., McGraw, v. 1, Fundamental principles, $2.50; v. 2, Retaining walls and buildings, $6; v. 3, Bridges and culverts, $6.
Mörsch, Emil. Concrete-steel construction. 1909. N. Y., McGraw, $5.
Taylor, F. W. and S. E. Thompson. Concrete costs. 1912. N. Y., Wiley, $5.
Taylor, F. W. Treatise on concrete, plain and reinforced. Ed. 3. 1917. N. Y., Wiley, $5.
Turneaure, F. E. and E. R. Maurer. Principles of reinforced concrete construction. Ed. 3. 1919. N. Y., Wiley, $3.25.
Twelvetrees, W. N. Treatise on reinforced concrete. 1920. N. Y., Pitman, $7.50.

Masonry Construction.

Baker, Ira Osborn. Treatise on masonry construction. Ed. 10. 1909. N. Y., Wiley, $4.50.
Siebert, John S. and F. C. Biggin. Modern stone cutting and masonry. 1896. N. Y., Wiley, $1.50.

Timber Construction.

Dewell, H. D. Timber framing. 1917. San Francisco, Dewey, $2.

Foundations. Bridge Piers and Abutments.

Corthell, Elmer L. Allowable pressure on deep foundations. 1907. N. Y., Wiley, $1.25.
Fowler, Charles Evan. Practical treatise on engineering and building foundations, including sub-aqueous foundations. Ed. 4. v. 1. 1920. N. Y., Wiley, $5.
Jacoby, Henry S. and Roland P. Davis. Foundations of bridges and buildings. 1914. N. Y., McGraw, $6.

Retaining Walls.

Cain, William. Practical designing of retaining walls, with appendices on stresses in masonry dams. Ed. 7. 1914. N. Y., Van Nostrand, 75c.
Ketchum, Milo S. Design of walls, bins and grain elevators. Ed. 3. 1919. N. Y., McGraw, $4.
Howe, M. A. Retaining walls for earth, Ed. 5. 1911. N. Y., Wiley, $1.25.
Paaswell, George. Retaining walls, their design and construction. 1920. N. Y., McGraw, $4.

Building Construction. Buildings.

Burt, Henry J. Steel construction. 1914. Chic., Am. Tech. Soc., $2.75.
Hool, G. A. and N. C. Johnson. Handbook of building construction data for architects, designing and constructing engineers and contractors. 2 v. 1920. N. Y., McGraw, $10.
Ketchum, Milo S. Design of steel mill buildings. Ed. 3. 1912. N. Y., McGraw, $5.
Walker, F. R. Building estimator's reference book. Ed 3. 1919. Chic., F. R. Walker, $10.

Model Factory Towns.

Knowles, Morris. Industrial housing. 1920. N. Y., McGraw, $5.

SURVEYING.

General Works.

Hosmer, G. L. Geodesy. 1919. N. Y., Wiley, $3.50.
Johnson, J. B. and L. S. Smith. Theory and practice of surveying. Ed. 17. 1910. N. Y., Wiley, $3.50.
Thomas, W. Norman. Surveying. 1920. London, Arnold, $10.50.
Tracy, J. C. Plane surveying and exercises in surveying. 1916. N. Y., Wiley, $3.

RAILROADS.

General Works.

Kirkman, Marshall M. Science of railways. 10 v. 1919. Chic., Cropley, Phillips Co., $64.

Location.

Allen, C. Frank. Field and office tables, specially applicable to railroads. Ed. 3. 1920. N. Y., McGraw, $2.50.
Allen, C. Frank. Railroad curves and earthwork. Ed. 6. 1920. N. Y., McGraw, $2.50.
Beahan, Willard. Field practice of railway location. Ed. 2. 1909. N. Y., McGraw, $3.
Lavis, Fred. Railway estimates, design, quantities and costs. 1917. N. Y., McGraw, $5.
Perkins, Lee. Railroad taper; the theory and application of a compound transition curve based upon thirty-foot chords. 1915. N. Y., Wiley, $2.50.
Raymond, W. G. Elements of railroad engineering. Ed. 3. 1917. N. Y., Wiley, $4.
Raymond, W. G. Railroad field manual for civil engineers. 1915. N. Y., Wiley, $3.
Searles, W. H. Field engineering. Ed. 18. 1919. N. Y., Wiley, $3.
Shunk, W. F. Field engineer. Ed. 21. 1918. N. Y., Van Nostrand, $2.50.
Wellington, Arthur Mellen. Economic theory of the location of railways. Ed. 6. 1900. N. Y., Wiley, $4.50.

Construction and Maintenance.

American Railway Engineering Association. Manual of recommended practice. 1915. Chic., A. R. E. A., $4.50.
Camp, Walter Mason. Notes on track. Construction and maintenance. Ed. 2. 1904. Auburn Park, Chic., The Author.

Crandall, B. V. Track labor cost data. 1920. 14 E. Jackson Boulevard, Chic., The Author, $2.50.
Crandall, Charles Lee, and F. A. Barnes. Railroad construction. 1913. N. Y., McGraw, $3.
Hermann, E. A. Steam shovels and steam shovel work. 1894. N. Y. McGraw.
Mills, William H. Railway construction. 1898. N. Y., Longmans, $7.
Orrock, J. W. Railroad structures and estimates. Ed. 2. 1918. N. Y., Wiley, $5.
Sellew, William H. Railway maintenance engineering. 1915. N. Y., Van Nostrand, $3.
Tratman, E. E. R. Railway track and track work. Ed. 3. 1908. N. Y., McGraw, $4.
Webb, Walter Loring. Railroad construction. Ed. 6. 1917. N. Y., Wiley, $4.

Tunnels and Subways.

Brunton, David W. and John A. Davis. Modern tunneling. 1914. N. Y., Wiley, $3.50.
Copperthwaite, William C. Tunnel shields and use of compressed air in subaqueous works. 1906. N. Y., Van Nostrand, $9.
Drinker, Henry S. Tunneling. Ed. 3. 1888. N. Y., Wiley.
Gilbert, G. H., Lucius I. Wightman and W. L. Saunders. Subways and tunnels of New York, methods and costs. 1912. N. Y., Wiley, $4.
Lauchli, Eugene. Tunneling. 1915. N. Y., McGraw, $3.
Prelini, Charles. Tunneling. Ed. 6. 1912. N. Y., Van Nostrand, $3.
Simms, Fred W. Practical tunneling. Ed. 4. 1896. London. Crosby, Lockwood & Sons, £1 1s.
Stauffer, David M. Modern tunnel practice. 1906. N. Y., McGraw, $3.50.

Rails.

Sellew, W. H. Steel rails. 1913. N. Y., Van Nostrand, $10.

Buildings and Shops.

Berg, Walter G. American railway shop systems. 1904. N. Y., Ry. Age Gazette, $2.
Berg, Walter G. Buildings and structures of American railroads. 1893. N. Y., Wiley, $5.

Yards and Terminals.

Crandall, B. V. Terminal cost data. 1919. Chic., Railway Education Press, $2.50.
Droege, John A. Freight terminals and trains. 1912. N. Y., McGraw, $5.
Droege, John A. Passenger terminals and trains. 1916. N. Y., McGraw, $5.

Cars and Locomotives.

American Railway Master Mechanics' Association. Locomotive dictionary and cyclopedia. Ed. 5. 1919. N. Y., Simmons-Boardman, $8.
Henderson, George R. Cost of locomotive operation. 1906. N. Y., Ry. Age Gazette, $2.50.
Henderson, George R. Locomotive operation. Ed. 2. 1904. N. Y., Ry. Age Gazette, $3.50.
Master Car Builders' Association. Car builders' dictionary and cyclopedia. Ed. 9. 1919. N. Y., Simmons-Boardman, $8.
Schmidt, Edward C. Freight train resistance. 1910. Urbana, Univ. of Ill., 80c.
Schmidt, Edward C. Passenger train resistance. 1918. Urbana, Univ. of Ill., 20c.

Signals and Signaling.

Anderson, J. Electric locking. 1918. N. Y., Simmons-Boardman, $2.
McCready, H. Alternating current signaling. Ed. 3. 1919. Swissvale, Pa., Union Switch & Signal Co., $3.
Railway Signal Association. Manual. 1913. Bethlehem, Pa., The Assoc.

Operation.

Haines, H. S. Efficient railway operation. 1919. N. Y., Macmillan, $4.

Accounting.

Adams, H. C. American railway accounting. 1918. N. Y., Holt, $3.
Eaton, J. Shirley. Handbook of railroad expenses. 1913. N. Y., McGraw, $3.
Woodlock, Thos. F. Anatomy of a railroad report. 1900. N. Y., Doubleday, 60c.

Transportation Economics, Including Rates.

Ackworth, W. M. Elements of railway economics. 1911. Oxford, The Clarendon Press, 2s.
Colson, C. Railway rates and traffic. 1914. London, G. Bell & Sons, 3s. 6d.
MacPherson, Logan G. Railroad freight rates in relation to the industry and commerce of the United States. 1909. N. Y., Holt, $2.25.
Noyes, Walter C. American railroad rates. 1905. Bost., Little, $1.50.
Raper, Chas. L. Railway transportation. 1912. N. Y., Putnam, $1.50. (Based on Hadley's Railroad transportation).
Ripley, William Z. Railroads, finance and organization. 1915. N. Y., Longmans, $4.
Ripley, William Z. Railroads, rates and regulation. 1912. N. Y., Longmans, $4.
Ripley, William Z., ed. Railway problems. Rev. ed. 1913. N. Y., Ginn, $2.50.
Ripley, William Z., ed. Trusts, pools and corporations. Rev. ed. 1916. N. Y., Ginn, $2.75.

Electric Railroads.

Blake, H. W. Electric railway transportation. 1917. N. Y., McGraw, $5.
Buck, A. M. Electric railway. 1915. N. Y., McGraw, $4.
Burch, Edward P. Electric traction for railway trains. 1911. N. Y., McGraw, $6.
Parshall, H. F. and H. M. Hobart. Electric railway engineering. 1907. N. Y., Van Nostrand, $7.50.

HIGHWAYS.

General.

Agg, T. R. Construction of roads and pavements. Ed. 2. 1921. N. Y., McGraw, $4.
Baker, I. O. Treatise on roads and pavements. Ed. 3. 1918. N. Y., Wiley, $4.50.
Blanchard, A. H., ed. American highway engineers' handbook. 1919. N. Y., Wiley, $5.
Goodell, J. M. Location, construction and maintenance of roads. 1918. N. Y., Van Nostrand, $2.
Tillson, George W. Street pavements and paving materials. Ed. 2. 1912. N. Y., Wiley, $4.

Asphalt.

Richardson, Clifford. Asphalt construction for pavements and highways: a pocket-book for engineers, contractors and inspectors. 1913. N. Y., McGraw, $2.

Dust Preventives.

Hubbard, Prévost. Dust preventives and road binders. 1910. N. Y., Wiley, $3.

HYDROLOGY. HYDRAULICS.

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ITEMS OF INTEREST

The Committee on Publications will be glad to receive communications of general interest to the Society, and will consider them for publication in *Proceedings* in "Items of Interest". This is intended to cover letters or suggestions from our membership concerning matters which are not of a technical character. Such communications, however, must not be controversial or commercial.

THE ENGINEERING FOUNDATION

The Engineering Foundation was established in 1914 "for the furtherance of research in science and engineering, or for the advancement in any other manner of the Profession of Engineering and the good of mankind", and for the following purposes: To promote and support worthy researches related to engineering in all its branches; to establish and operate engineering research laboratories, if funds be provided therefor; to co-operate with National Research Council and the Engineering Societies in the stimulation and co-ordination of scientific research.

Endowment Funds Needed.

The Foundation needs a large increase of endowment. It is obliged frequently to refuse to support research projects brought to it because it lacks funds. Gifts of $1 000 or more are desired. Each donor of $250 000 or more will be honored as a Founder. A gift of $50 000 has been offered contingent on the receipt of nine other gifts of $50 000 each. Gifts to the Foundation are exempt from income tax.

A gift for research is a productive investment.

The Engineering Foundation is administered under the auspices of the United Engineering Society, the American Society of Civil Engineers, the American Institute of Mining and Metallurgical Engineers, the American Society of Mechanical Engineers, and the American Institute of Electrical Engineers, by a board of thirteen representatives of these Societies, and three members at large.

A progress report of the Foundation, a form of Deed of Gift, and other information will be sent by the Secretary, Alfred D. Flinn, M. Am. Soc. C. E., 29 West 39th Street, New York City, on request.

Engineers Again Urged to Support Nolan Patent Office Bill

The Nolan Bill for the relief of the Patent Office at Washington failed of passage by the last Congress on account of a questionable rider attached by the Senate. The persistent work of the friends of this bill, including the engineers of the various National Societies, has, however, made itself felt in both the House and the Senate. The bill is to be reintroduced, and there is a good chance of its passage without delay.

The Patent Office has been neglected for a long term of years. Salaries of employees have not been advanced with the increased cost of living, and cannot be except by Act of Congress. No department at Washington is in greater need of reorganization; but first of all salaries must be made sufficient to maintain a proper personnel of expert examiners and other employees.

When Engineering Council was organized in 1918 it appointed a committee known as the Patents Committee, which, in co-operation with committees representing other interests, has been laboring since that time to secure remedial legislation. A very careful study was made of the whole subject, and a bill embodying only the most pressing needs was introduced in the House. This bill is known as Nolan Patent Office Bill, H. R. 11 984, and in due course it passed the House with only six dissenting votes. The struggle in the Senate over the Peace Treaty and other pressing legislation made it almost impossible to secure attention to other matters, and the Patent Committee appealed to the engineers of the country to exercise their personal influence. A circular letter was sent to each member of the Society, asking him to write to his Senators, urging their favorable consideration of the bill as it passed the House. The Senate finally passed the bill, but with amendments which required its reference to a Conference Committee. In January, 1921, the Conference Committee reported the bill back to the House and Senate, in the original form, except that it retained a rider put into the bill by the Senate, and this, as already stated, prevented its enactment into law by the last Congress.

This rider is now known as the Federal Trade Commission Section of the bill. It gives the Federal Trade Commission power to accept assignments of patents, and to administer inventions and patents for Government employees. By many this is held to be objectionable. It seems to involve the licensing of patents to others, the protection of patents in the Courts, and other entirely new functions for the Federal Trade Commission. It may also serve as an opening wedge for further legislation covering assignments from other inventors.

Such proposed legislation is questionable. The Patents' Committee has made an adverse report regarding it, and it is now asking for another effort by the engineers of the country to prevent the enactment of this section, in this connection or otherwise, and to secure the passage of the bill as originally proposed without further delay. It is desired that every member of the American Society of Civil Engineers should write a personal letter to his Senators and to his Representative in the House, urging them to do all that they possibly can to eliminate the Federal Trade Commission section of the Nolan Bill if it is reintroduced, and to secure the passage of the remedial legislation along the lines of the original Nolan Bill at the very earliest possible date.

Personnel Research Federation Formed

Under the auspices of the National Research Council and Engineering Foundation, in the National Research Council Building, Washington, D. C., the organization of a Personnel Research Federation was effected on March 15th, 1921. This Federation includes in its membership scientific, engineering, labor, management, and educational bodies. It has been organized to bring about interchange of research information among the numerous organizations which are engaged in personnel research. The Bureau of Labor Statistics of the U. S. Department of Labor reports that there are 250 such organizations in the United States. The Personnel Research Federation will collect research information, will encourage research through individuals and organizations, and will co-ordinate research activities.

Temporary officers were elected as follows: Chairman, Robert M. Yerkes, representing the National Research Council; Vice-Chairman, Samuel Gompers,

representing the American Federation of Labor; Treasurer, Robert W. Bruere, representing the Bureau of Industrial Research; Secretary, Alfred D. Flinn, representing the Engineering Foundation; Acting Director, Beardsley Ruml, Assistant to the President of the Carnegie Corporation of New York City.

The aims of the new organization are the increased efficiency of all the personnel elements of industry—employer, manager, worker—and improved safety, health, comfort, and relationships. Its immediate purposes are to learn what organizations are studying one or more problems relating to personnel, and the scope of their endeavors, and to determine whether these endeavors can be harmonized, duplication minimized, neglected phases of the problems considered, and advanced work undertaken.

Preliminary Conference Held in Washington.

On November 12th, 1920, a preliminary conference was held in Washington, D. C., under the auspices of the National Research Council and Engineering Foundation, attended by forty persons, including representatives of National organizations of scientists, engineers, labor, capital, managers, educators, economists, and sociologists. The question under discussion was the practicability of bringing about co-operation among the many bodies conducting research relating to men and women in industry and commerce, from management to unskilled labor. Such topics as the relations of persons doing different parts of the work, and the influence of working conditions on the health, output, and happiness of the workers, are examples of those which could be made subjects of research.

Mr. H. A. Bumstead, Chairman of National Research Council, presided. Dr. James R. Angell, first Chairman of the Research Council's Committee, President of the Carnegie Corporation, of New York City, and President-elect of Yale University, under the heading "Reasons and Plans for Research Relating to Industrial Personnel", outlined the needs and possibilities, feasible procedures, certain limitations and dangers, and indicated some types of problems worthy of research. He summarized in the following words the kinds of problems which should receive attention from the organization:

"Certain of the hygienic problems of modern industry exemplify cases in which a thoroughly scientific study of causes and effects is possible, with convincing conclusions regarding practice which will safeguard the health and vigor of all concerned. Not a few highly important results have already been attained in this field. The effects on industrial productivity on the one hand, and physical vitality, on the other, of good and bad ventilation, of good and bad light, of high temperatures, of irritant fumes, of dust and other similar features are, theoretically, at least, within the field of scientific analysis, and the ascertainment of demonstrable fact. Similarly, and in a different zone of inquiry, it should be possible to secure thoroughly reliable data regarding the dominant causes of unrest in our industries, of excessive turnover, and the like. Many other instances of the same kind will suggest themselves to all who have experience in the industrial field."

"Co-operation of Workers in Studies of Industrial Personnel Matters" was the subject of an address by President Samuel Gompers of the American Federation of Labor. He stated Labor's appreciation of research, but opposition to exploitation, and suggested plans for work, and a few problems needing study. Chairman Robert W. Bruere, for the Committee on Present Status of Industrial Personnel Research which had been appointed in advance, presented a report giving information about

the growth of research relating to personnel in industry, some of the organizations carrying it on, and a classification of such organizations as: (1) Individual Companies; (2) Trade Unions; (3) Chambers of Commerce; (4) Governmental Agencies; (5) Associations of Employers; (6) Organizations to Popularize Results of Research; and (7) Organizations for Specific Personnel Research.

Origin of the Movement.

The underlying ideas which led to the Conference were: (1) the advantages of studying such questions by the scientific method of gathering facts and using them to reach conclusions, instead of discussing opinions and propaganda; and (2) the need for co-operation among the organizations and individuals engaged in such studies.

In response to a request from the Preliminary Conference, the Bureau of Labor Statistics of the U. S. Department of Labor undertook to compile a catalogue of organizations in the United States giving attention to personnel problems. This investigation, completed for the Bureau by Dr. J. David Thompson, has revealed that there are 250 such organizations.

Late in 1918, Engineering Foundation undertook a limited study of the adjustment in industry of persons of peculiar traits or limited mental capacity. It was understood, however, that this was only one problem, and not the most important of a large number relating to men and women and their work. Since the larger study would go into many fields of science and sociology, Engineering Foundation in June, 1919, requested the National Research Council to consider the possibility of organizing research on a suitable scale, chiefly by bringing into co-operation the agencies already in this field. Numerous organizations and individuals were known to be studying personnel matters, independently, with few direct contacts, no co-ordination, no programme, and little co-operation. How numerous were these organizations was not even suspected at that time. Several important parts of the subject were, nevertheless, receiving little or no attention.

The Research Council appointed a committee. This Committee sought information and advice from many persons and organizations interested in all phases of these questions. It was determined to call a small, but representative, preliminary conference at which the idea could be discussed in an informal way and some plan worked out for trial. After a year's investigation, this Committee issued invitations in the early summer of 1920 for the Conference, which was held in the National Research Council Building, Washington, D. C.

Functions and Scope of the Federation.

The plans outlined for the work of the Federation include the following:

1.—Collection and dissemination of information through (*a*) registration of researches contemplated, in progress, or completed; (*b*) collection of research information; (*c*) cataloguing and analyzing the research information; (*d*) collecting and analyzing methods of instruction and training for personnel work; (*e*) publication; (*f*) publicity; (*g*) consultation and advice, when requested.

2.—Stimulation and initiation of research through individuals, organizations, and Governmental agencies by (*a*) publicity and correspondence; (*b*) personal contact with research agencies; (*c*) advice and encouragement in the formation of

necessary new agencies; (*d*) aiding governmental agencies to secure appropriations necessary for them adequately to carry on personnel and employment work; (*e*) calling special conferences; (*f*) definition of problems needing investigation.

3.—Co-ordination of research activities through (*a*) regular meetings of representatives of co-operating agencies; (*b*) regular reports of affiliated agencies on work in progress and completed; (*c*) correspondence and personal consultation.

The Personnel Research Federation is beginning modestly and will extend its efforts as it gains in number of members and in financial support. It does not propose to undertake at the beginning all the functions outlined. The Federation is not another agency for research, but rather a clearing house for existing agencies.

American Engineering Standards Committee

Although much of the time and effort of the American Engineering Standards Committee has necessarily been spent in laying a basis for work the fruition of which will require at least two or three years, progress has been made in the unification of the more important standards and in overcoming the confusion that was being produced by the numerous organizations (more than 100) which hitherto published engineering standards without systematic co-operation among themselves.

Prior to December 31st, 1920, there had been approved by the Committee Tentative American Standard Specifications and Tests for Portland Cement, Tentative American Standard Specifications for Fire Tests of Materials and Construction, and American Standard Pipe Threads, and there had been submitted for approval by the Committee the National Electrical Code as an American standard and Standard Test for Toughness of Rock, Standard Method of Distillation of Bituminous Materials for Road Treatment, and Standard Method of Sampling Coal, as tentative American standards, with the Safety Code for Head and Eye Protection submitted for approval as recommended American practice.

The Committee is now composed of 47 members representing 17 bodies or groups of bodies, including 6 National engineering societies, 5 Governmental departments, and 13 National industrial associations. Its function is merely to see that each body or group concerned in a standard shall have opportunity to participate in its formulation, which is in the hands of a working committee, technically called a Sectional Committee. Each Sectional Committee is organized by, and under the leadership of, one or more of the principal bodies interested, such bodies being known as Sponsors.

An important part of the Committee's work relates to safety codes. On December 8th, 1920, at a conference at which more than 100 organizations were represented it was unanimously voted that a comprehensive programme of safety codes should be undertaken, to be carried out under the auspices of the American Engineering Standards Committee to insure proper co-ordination and elimination of overlap, etc. Active work is now in progress on 24 such codes with hearty co-operation among the State commissions, associations of insurance companies, National engineering societies, manufacturers' and industrial associations, labor and civic organizations, and technical bureaus of the Federal Government. As is true of all work under the auspices of the American Engineering Standards Committee, such of the bodies as are interested in the particular code in question are represented in the committees responsible for the formulation of each code.

Copies of the Annual Report of the Committee may be obtained by addressing a request to the American Engineering Standards Committee, 29 West 39th Street, New York. In addition to the foregoing brief abstract of the general features of the report, a few extracts follow:

Brief Extracts of Annual Report.

"The organization of a Sectional Committee for the standardization of shapes of structural steel resulted from the suggestion that a considerable degree of international standardization should be possible. Considerable progress has been made and a tentative report* prepared providing for a single series of shapes for structural steel for shipbuilding and for general structural work. This report is now before the various interested bodies for consideration. A representative of the committee, Mr. E. H. Rigg, was abroad during the early summer of 1920 conferring with the British committee on the work.

"There are now National standardizing bodies in Austria, Belgium, Canada, France, Germany, Great Britain, Holland, Italy, Sweden, and Switzerland. The Committee is in touch with all of these and is actively co-operating with several of them; for example (in addition to those already mentioned), with the Swiss in the matter of ball bearings and nuts and boltheads, the Belgians on zinc, the British on gauges and machine tools, and the Canadians on elevators and some of the safety codes.

"A National standardizing body is being formed in Japan, and in this connection Mr. G. Tsuda, a representative of the Japanese Government, recently spent about two months in the United States studying industrial standardization.

"In April, 1920, the Secretary of the Committee had opportunity to visit the National bodies in Belgium, France, Great Britain, and Holland, and secured most valuable information from the work and experience of these bodies.

Information Service.

"It is planned that the office shall serve as a bureau of information on engineering standardization, keeping in touch with all that is going on in connection with standardization both in America and abroad, so that full and reliable information on any subject in connection with standardization work may be promptly given. While only an extremely modest beginning has been made, it has usually been possible to give some assistance in response to the frequent calls for information which are received. It is hoped, however, that in the near future means will be provided to build up a really efficient and effective information service. The functions of such a service should not be limited to answering inquiries and to providing information for the use of sectional committees, but information of interest to the various branches of our technical industries should be placed at their disposal promptly, both through direct contact with the various industrial associations, and through the technical press.

"By order of the Committee,
"A. A. Stevenson, *Chairman.*
"P. G. Agnew, *Secretary.*"

Meeting of March 12th, 1921.

A meeting of the American Engineering Standards Committee was held on March 12th, 1921, with 30 representatives and 3 guests present, Chairman Stevenson presiding.

The question whether the Committee should be represented at the London Conference of Secretaries was considered, and it was moved that Secretary Agnew should attend this Conference, even if it should be necessary to incur a deficit

* *Proceedings*, Am. Soc. C. E., August, 1920, p. 575.

which would have to be made up by securing special contributions, and it was further unanimously resolved that the Finance Committee be instructed to take immediate steps to secure such contributions.

It was unanimously resolved that the present provisions in the Constitution which place time limits on the revision of standards should be made advisory instead of mandatory, and that such matters may be more appropriately incorporated in Rules of Procedure, or in resolutions by the Main Committee than in the Constitution; it was further resolved that the Rules Committee be instructed to formulate appropriate amendments for carrying out the intent of this resolution.

The American Society for Testing Materials Standards for (1) Method for Distillation of Bituminous Materials Suitable for Road Treatment, (2) Method for Sampling Coal, (3) Test for Toughness of Rock, were ordered to letter-ballot of the Main Committee with the recommendation that they be approved as Tentative American Standards.

A resolution was passed requesting the Executive Committee to take any action, which, in its judgment, may be advisable to further stimulate favorable consideration of the subject of standardization by the U. S. Chamber of Commerce and similar organizations. It was informally agreed that inasmuch as the International Chamber of Commerce is considering some form of organization of the various National standardizing bodies under its auspices, it might be desirable for the Secretary to remain abroad long enough to attend the meeting of that Chamber in June.

The Chairman called attention to the activities of the British Engineering Standards Association in promoting the use of British standards in foreign trade, stating that a fund of £24 000 of which the Government had contributed £10 000 had been used in translating specifications into French, Italian, Spanish, and Portuguese. It was voted that a special committee be appointed to study the question carefully and report its recommendations.

The results of letter-ballots were announced, showing that the Head and Eye Safety Code was approved by a vote of 40 in favor and 1 opposed, and the Revised Specifications and Tests for Portland Cement was approved by a vote of 41 in favor and none against.

Mr. George G. Stone was designated as the representative of the Committee on the American Bureau of Welding.

It was unanimously resolved that general authority be given the Chairman to appoint a special committee for the consideration of a standard immediately upon the submission of such standard for approval; and also to appoint a special committee for the consideration of the personnel of a Sectional Committee immediately upon the submission of such personnel for approval.

Tank Corps for New York State National Guard

The formation of a Tank Corps within the New York State National Guard is actively progressing, and engineers are urged to enlist in this interesting and diversified branch of service. Recruiting is proceeding every Monday evening at the office of Lewis K. Davis, 347 Lexington Avenue, and on Thursday evenings at the 8th Coast Command Armory in the Bronx, New York City. Juniors of the Society are especially requested to investigate this opportunity.

It is the desire of the organizers to federalize this corps at the earliest possible date. The 8th Coast Command Armory at which schools will be established is one of the largest and best appointed in the country, and is located close to the maneuver field. It is equipped with a gymnasium, club rooms, tennis courts, and every facility for physical development. The schools will be organized for training in tank driving; minor repairs; use of machine guns, 37-mm. rifles, and pistols; reconnaissance; and in radio, telephone, and telegraph operations.

History of Engineering Council

A final report and brief history of Engineering Council from the time of its organization in the Spring of 1917 as a Department of United Engineering Society to the time of its discontinuance on December 31st, 1920, has been prepared by J. Parke Channing, Chairman from 1918 to 1920, Philip N. Moore, and Alfred D. Flinn, Secretary. It contains short statements of the activities of Council during the World War and in the reconstruction period, including details of the work of the Military Affairs Committee, the National Service Department, the Engineering Societies Employment Bureau, the License Committee, and the Committee on Classification and Compensation of Engineers. In appendices are given the By-laws of United Engineering Society, the rules for admission to Engineering Council, the field of activity of Council, the officers, and the names of members of committees.

Copies of this report may be obtained by applying to Alfred D. Flinn, Secretary of United Engineering Society, 33 West 39th Street, New York City.

BRIEF NOTES

Nearly 200 applications for permits and licenses have been received by the Federal Power Commission. These applications cover over 13 000 000 h. p., and have come from every section of the country.

The State of Wyoming has contemplated the installation of small beacons along its highways to warn motorists of railroad crossings and dangerous curves. These beacons will be of the "flashing" type, 8 ft. high, visible for three miles. There will be distinctive colors for railroad crossings and for curves.

It is estimated that 30% of the world's ship tonnage is now out of use, or 17 000 000 gross tons out of the 56 800 000 gross tons afloat on January 1st, 1921. Every country, including the United States, is similarly affected. About one-half of the Shipping Board's 6 900 000 gross tons of steel tonnage is idle or awaiting assignment.

The largest purchasers of American coal during the first 11 months of 1920 were Canada (which imported 19 305 000 short tons), and France (which imported 3 910 377 short tons). Italy, the Netherlands, Argentina, Cuba, Sweden, Denmark, Brazil, Switzerland, Norway, and Egypt each imported more than 600 000 short tons. The total exports during this period were at the rate of about 44 000 000 tons per annum.

Since the *Olympic* was equipped as an oil-burning ship, her tank capacity has been increased from 5 068 tons to 7 555 tons. The one-way consumption of oil,

taken as an average over several voyages, is nearly 3 600 tons per voyage. The conversion to oil released space for about 1 000 tons of cargo in the old bunkers, and other space has been used for pump rooms, etc.

Electric traction on canals is being considered for extensive use in France, in view of the large volume of traffic which these waterways will have to handle in the near future. It is suggested that the St. Quentin Canal be supplied with electric current by an overhead trolley wire, and that special electric tractors be used to haul the barges through the locks.

On February 23d, 1921, the U. S. Mail Service broke all records for fast mail between San Francisco and New York City, when an airplane reached Mineola with 7 lb. of mail after covering the distance of 2 700 miles in actual time of 33 hours and 20 minutes. This is twice as fast as mail has ever been carried between these two cities by the air route. Night flying made the record possible. Jack Knight, of Cheyenne, Wyo., carried the mail throughout the night, steering by compass, between Omaha, Nebr., and Chicago, Ill., although the route was new to him.

The scarcity of fuel has turned the attention of French and British engineers to the possibility of deriving power from the tides. The power obtainable from a given area is proportional to the square of the tidal range, and this range is very great on the coasts of France and Great Britain. The cost of machinery decreases as the operating head of water increases. It is estimated that with a tidal range of only 20 ft. for spring tide, and 10 ft. for neap tide, operating on both rise and fall, each square mile of area of basin can, without storage, produce a daily average of 110 000 horse-power.

At one time the virgin forests of the United States covered 822 000 000 acres, but they are now reduced to one-sixth of that area, all classes of forest land only aggregating 463 000 000 acres. The fundamental problem to-day is how to increase the production of timber by stopping forest devastation. The new timber remaining in the United States is estimated roughly at 2 215 000 000 000 board-feet, three-fourths of which is in virgin forest and the rest is second growth of relatively inferior quality. About one-half of the timber remaining is in the three Pacific Coast States, and more than 61% is west of the Great Plains. The total yearly consumption of all classes of timber is about 26 000 000 000 board-feet, and the depleted forests are growing less than one-fourth of this amount.

ACTIVITIES OF LOCAL SECTIONS*

Annual Meeting of the San Francisco Section

The Sixteenth Annual Meeting (Ninety-fourth regular meeting) of the San Francisco Section was held at the Engineers' Club on December 21st, 1920; President M. M. O'Shaughnessy in the chair; N. A. Bowers, Secretary; and 130 members and guests present.

Mr. W. H. Popert, reporting for the Publicity Committee, stated that when the Committee was organized early in 1920 one member was assigned to each of the San Francisco daily papers, and that as a result of their activities, notices of every meeting and excursion held by the Section had been given publicity in one or more of these dailies.

Mr. E. O. Edgerton, President of the Railroad Commission of California, was present as a guest. Requested to address the meeting, he mentioned his impression, gained from contact with engineers and the work which they do, that it is fundamentally necessary to give the engineer authority in his work and to protect him from political or other kinds of interference. If necessary, means must be used deliberately to create a public sentiment supporting the engineer in order that he may carry out his work to the best advantage. As an example of how this would be done by proper methods, he cited the case of William Mulholland, M. Am. Soc. C. E., and his success in building the Los Angeles Aqueduct.

Mr. Edgerton called attention to the need for organizing civic bodies to the end that community enterprises should have the support of business men, saying that the time has come to put an end to the unreasoning prejudice against anything and everything that is owned by the municipality. The business men of the community, he said, must see to it that municipal ventures are put through on a business basis. Mr. Edgerton cited Los Angeles as an excellent example of a community where the right sentiment is fostered—even men who do not, on the whole, believe in public ownership nevertheless support the city's ventures in owning and operating water and power utilities.

Mr. E. T. Thurston suggested that it would be desirable to devote more of the time of meetings of the Section to Society affairs. He pointed out that the territory influenced by the San Francisco Section polled the lowest vote recorded in recent Society balloting, and suggested that in order to facilitate consideration of Society questions by the Section, a Standing Committee on Society Affairs should be appointed to study and report recommendations on current matters of vital importance to the Society, this committee to report at each meeting.

The following officers were elected: Frederick R. Muhs, President; Thomas H. Means, Vice-President; Nathan A. Bowers, Secretary-Treasurer.

Hetch Hetchy Memorial.

Prof. Charles Derleth, Jr., Chairman of the Committee which arranged for the Hetch Hetchy trip, in an eloquent address, announced that those members of the Section who went on the Hetch Hetchy excursion in June, 1920, desired to express to President O'Shaughnessy their appreciation of his courtesy as a host, and at the same time to express their confidence in the way in which the Hetch

* For list of Local Sections, Officers, Meetings, etc., see p. 425.

Hetchy project is being carried out. A committee appointed to act on this decision submitted a parchment, bound in sealskin, on which these sentiments were engrossed, and which was signed by thirty-three members who participated in the excursion.

Prof. Derleth read the illuminated inscriptions, as follows:

"To Michael Maurice O'Shaughnessy, in commemoration of the Hetch Hetchy trip by the San Francisco Section, American Society of Civil Engineers, June, 1920.

"In appreciation of your courtesy, hospitality, and good fellowship; in recognition of the excellence of design and high character of workmanship, we present this token with sincere congratulations.

"We believe the Hetch Hetchy project is destined to render a continuous service of inestimable value and we confidently look forward to its early completion."

President O'Shaughnessy, very evidently touched by the spirit of the gift, expressed his sincere appreciation and thanks. He received the token, he said, for his colleagues as well as for himself, and spoke of the faithful support he had received from his staff, to which he attributed due measure of success in carrying on the Hetch Hetchy project.

Addresses on Hydro-Electric Development.

Mr. Wigginton E. Creed, President of the Pacific Gas and Electric Company, the first speaker of the evening, discussed the subject "Economic Aspects of the Present Hydro-Electric Situation". He said that the important elements in California's industrial future are population and cheap power; in recent years the population has been rapidly increasing, and the present need is for cheap power. He stated that too much dependence has been placed on oil; the oil industry has assumed more of the industrial burden than it can permanently carry, and it has been an economic mistake to permit this. He gave the relative extent to which the chief sources of energy are now used in California as follows: Oil, 64%; hydro-electric power, 21%; coal and coke, 16%.

Mr. Creed said that there is need for an additional 100 000 h.p. of hydro-electric power every year to meet present needs and take care of growth at the present rate. To relieve the present excessive burden on the oil industry so that oil resources may be conserved for other uses, hydro-electric power must be developed at a still more rapid rate. Considering a rate of increase of 100 000 h.p. per annum, and taking the cost of development as $350 to $400 per horse-power, there would be needed an annual investment of $40 000 000 for the necessary development in California. Within the next ten years, if California takes advantage of its physical opportunities, there will be need for the investment of between $500 000 000 and $800 000 000.

E. C. Hutchinson, M. Am. Soc. C. E., Chief Engineer of the Pelton Water Wheel Company, speaking of recent rapid development in modern hydraulic equipment, pointed out that there is a tendency to use much larger units both in impulse and reaction types of water wheels, and particularly that higher heads are being used with success, both as to efficiency and economy, in reaction turbines. Greater governor precision is being secured and automatic operation and remote control are being developed to a high degree. Mr. Hutchinson showed a series of most

interesting slides depicting typical developments and showing large units recently constructed.

Rex C. Starr, M. Am. Soc. C. E., the third speaker of the evening, described in an interesting way the methods whereby records had been made in the construction of the Kerckhoff hydro-electric development. These included the design of a safe dam for speedy construction and low cost that would contain a minimum quantity of concrete; methods of tunnel crew management whereby headings were advanced at an unprecedented rate, and the concentration of thought and energy on making speed in assembly of power-house equipment. Mr. Starr pointed out that considerable expenditures for equipment were justified if they resulted in shortening the construction period, and thereby decreasing interest on the investment during its non-operative period.

Joint Meeting and Special Meeting of San Francisco Section

On the evening of January 25th, 1921, the San Francisco Section was represented by 31 members and 24 ladies at a joint meeting with members of the National Association of Railroad Tie Producers and the American Wood Preservers Association, which were holding their Annual Convention in San Francisco. Members of the Section had been invited to all the sessions of the Convention, but this particular joint meeting was arranged for the special purpose of bringing the members of the three Societies together.

The ladies, as guests of the Tie Producers Association, attended a theatrical entertainment while the men considered the topic of the evening—the teredo problem in San Franciso Bay waters.

Special Meeting of February 4th, 1921.

A special meeting of the Section for the purpose of considering the engineering phases of the Marshall plan for distributing the flow of the Sacramento and San Joaquin Valley streams for irrigation purposes, was held on February 4th, 1921, Mr. W. L. Huber acting as Chairman, 61 members being present. The Chairman asked Mr. F. H. Tibbetts to sketch briefly the main features of the Marshall scheme, and show its relation to the present situation in California's central flood basin.

Mr. Tibbetts suggested that thought and discussion should be directed toward the passing of a resolution before adjournment to recommend action by the San Francisco Engineering Council. He pointed out that the Marshall plan would place all water and power resources under State control, and would include a dam across the Carquinez Straits, a tunnel which would divert water from the Klamath River through the Siskiyous into the Sacramento Valley, and a tunnel to deliver water from Kern River to Southern California. He then proceeded to show in detail why the plan was not feasible, and why publicity for the scheme would react to harm legitimate irrigation and reclamation work. The subject was discussed by Messrs. Parton, Chandler, Galloway, Cope, Means, Jorgensen, Nickerson, Howells, Harroun, Ware, Markwart, Whitney, Scobey, Norboe, Lee, Wadsworth, and Kieffer.

After considering the report of a committee appointed by the meeting to prepare a form of resolution, the following was unanimously adopted:

"Resolved: That it be the sense of this meeting that the Marshall plan obviously is physically, legally, and financially impossible of accomplishment, and the move to promote it or any consideration of it by the Legislature, either directly or indirectly, may prove inimical to public interests by delaying or diverting attention from urgently needed and immediately feasible land development work."

After further discussion, the following resolution also was adopted:

"Resolved: That it is the sense of this meeting of the San Francisco Section of the American Society of Civil Engineers, that if the Legislature deems it wise to appropriate any money for investigating the water problems of the State, that such investigation be general, that such sums be expended by the State Engineering Department and other related and existing State agencies, and that no appropriation be made for the investigation of any particular project or scheme."

Mr. C. H. Lee, of the Water Commission, discussed a number of bills relating to water rights of the State which are now proposed for action by the State Legislature. On motion, duly made, and seconded, the meeting voted unanimously that the Chair appoint a committee of three to study bills affecting water rights, and to report to the meeting of February 15th, 1921. Subsequently, Messrs. T. H. Means, Chairman, Norton Ware, and F. C. Herrmann were appointed on this Committee.

Ninety-fifth Regular Meeting of the San Francisco Section

The Ninety-fifth regular meeting of the San Francisco Section was held at the Engineers' Club on February 19th, 1921, 105 members and guests present.

Mr. Jerome Newman, Chairman of the Civil Service Committee, reported that the Committee had finished its work, reviewed the results obtained by interviews with the Secretary of the State Civil Service Commission, and stated that the civil engineers were successful in having their desired classification adopted. As to increase in compensation, he stated that conditions had changed so that it was doubtful whether any advance could be made. The Committee was discharged with thanks.

Secretary Bowers submitted a brief statement of the action taken by the Special Meeting of the Section held February 4th, 1921, to discuss the Marshall plan, and announced that on February 8th the San Francisco Engineering Council had adopted resolutions similar to those adopted by the Section. On motion, duly seconded, and carried unanimously, the meeting endorsed the action of the Special Meeting disapproving of the Marshall plan for engineering reasons.

Mr. E. J. Schneider, Chairman of the Committee on the National Department of Public Works, presented a final report, stating that the Federated American Engineering Societies has taken this matter in charge. Congress and President-elect Harding are committed to a re-organization, and he expressed the belief that this is largely a result of the activities of the National Department of Public Works Association. The Committee was discharged with thanks.

President Muhs announced the personnel of committees for 1921, as follows:

Publicity Committee: H. J. Brunnier, Chairman, A. J. Cleary, and J. C. Dort.

Committee on Excursions: J. O. Burrage, Chairman, E. L. Cope, and N. D. Baker.

A letter from Acting Secretary H. S. Crocker of the Parent Society, urging the appointment of an engineer on the Interstate Commerce Commission, was considered. Mr. C. E. Grunsky read a letter which he considered appropriate for the Section to send to Congressmen from California, and on motion, duly seconded, and carried, the form of letter was adopted.

Mr. E. T. Thurston moved that a committee be appointed to consider Society affairs in which it is desirable to secure an active interest on the part of the membership, the committee to present at regular meetings of the Section such information as would aid members in reaching intelligent decisions before voting on such questions. The motion was duly seconded and carried.

President Muhs presented the Annual Presidential Address.

Regular Meeting of the Colorado Section

The 116th Regular Meeting of the Colorado Section was held on March 14th, 1921; President Oliver T. Reedy in the chair; John S. Means, Secretary; and present, also, 12 members and one guest.

A letter from Acting Secretary H. S. Crocker of the Parent Society concerning the preparation of a biographical directory of the members of the four Founder Societies was read. Following a discussion, it was moved, seconded, and carried that the Section opposes the publication of such a directory, while being in favor of the compilation of such data for the use of the Secretary's office in New York City.

A committee consisting of Messrs. John E. Field and John S. Means was appointed to draft a letter to the Senators and Congressmen from Colorado requesting that they urge President Harding to appoint an engineer on the Interstate Commerce Commission.

A resolution passed by the Portland Section in regard to the method of publishing papers and discussions was read. It was moved, seconded, and carried that the Colorado Section express itself in favor of the return to the former method of publishing in full in *Proceedings* all technical papers as soon as, in the judgment of the Board of Direction, the financial status of the Society would warrant.

Mr. A. E. Palen, Chairman of the Committee on Classification and Compensation, made a progress report. It was moved, seconded, and carried that the Committee be continued in order to formulate a reply to the letter of Engineering Council on this subject, expressing the Section's endorsement of the work already accomplished and of the schedule of compensation proposed.

The first speaker of the evening, Professor W. C. Huntington of the College of Civil Engineering, University of Colorado, outlined the progress of the construction work carried out on the campus of the University since 1917. He stated that the Civil Engineering Department had been called on to prepare a campus map, superintend the quarrying of the rock used in construction, oversee the erection of barracks for troops during the war, install 1 200 ft. of heating tunnel, erect a new engineering shop, and supervise the erection of the new Liberal Arts Building and the completion of the Machy Auditorium. The lecture was illustrated with lantern slides indicating the magnitude of the work.

Professor I. C. Crawford, also of the University of Colorado, gave an interesting address on the reorganization of the army engineer service. He outlined briefly

the improvements based on the experience gained during the World War, and explained the tendency to reduce the number of troops in specialized battalions and increase the number of general engineer troops, keeping as specialists only the qualified and competent men, the latter to be given a higher rating than in the past.

Regular Meeting of Connecticut Section

A meeting of the Connecticut Section was held at the Graduates Club, New Haven, Conn., on February 5th, 1921, 26 members and 2 guests being present. President Charles R. Harte announced the special subject for the meeting to be the bill for the registration of engineers and land surveyors now before the Connecticut Legislature.

On motion, duly seconded and carried, Mr. L. C. Smith, Chairman of the Legislative Committee of the Local Section of the American Association of Engineers, was invited to take part in the meeting. Mr. Smith explained the bill as drawn up by that Committee, stating that it was patterned after the Uniform Registration Law recommended by Engineering Council.

The following motion, as amended after a thorough discussion, was carried unanimously:

"That the Connecticut Section go on record as favoring a licensing law for engineers and land surveyors, said law to contain the following conditions defining the duties that would require licenses: (1) Engineers who are directly responsible to the owner or his agent for the execution of work the failure of which would endanger public safety or the public health; (2) Land Surveyors whose surveys are to be filed with any town, city, county or State office, board, or department, or are submitted as evidence before any State Court."

On motion, duly seconded and carried, the Chair was authorized to appoint a committee of three to act with any other similar committees of other organizations to formulate and frame a suitable licensing law as conditioned by the foregoing motion. It was also moved, seconded, and carried, that a committee of members who are also members of the Connecticut Society of Civil Engineers be appointed to address the Annual Meeting of the latter in regard to the proposed licensing law. A supplementary motion was duly seconded and carried, stating that it was the sense of the meeting that members on the Board to be established under the proposed law should not receive any compensation except expenses.

President Harte read a letter from Acting Secretary H. S. Crocker of the Parent Society regarding the desirability of an engineer on the Interstate Commerce Commission. It was moved, seconded and carried, that it was the sense of the meeting that members should bring to the attention of Senators and Congressmen the need for a civil engineer on the Interstate Commerce Commission, and to urge them to so advise President-elect Harding. The Secretary was instructed to write to the Senators and Congressmen of Connecticut, and individual members present also agreed to communicate with their representatives in Congress.

On motion, duly seconded, and carried, a uniform letter-head for the Connecticut Section as recommended by the Publication Committee of the Parent Society was ordered.

Regular Meetings of the Duluth Section

A regular meeting of the Duluth Section was held on February 21st, 1921, at 12:15 P. M.; W. A. Clark, President; W. G. Zimmermann, Secretary; and 25 members and 10 guests present.

A letter from Acting Secretary H. S. Crocker of the Parent Society in reference to recent agitation to obtain the appointment of an engineer on the Interstate Commerce Commission was read. The matter was referred to a committee consisting of Messrs. Christie, Dresser, and Taylor, to report with recommendations at the next meeting.

A letter from Mr. Darling containing a carefully selected list of books suitable for the Public Library of the City of Duluth was read and referred to the Library Committee.

President Clark announced that as Col. F. A. Pope, Past-President of the Duluth Engineers' Club, and an active member of the Section, had received notification of his transfer from Duluth to the Philippine Islands to take effect within two weeks, the meeting would be in the nature of a farewell to him. Mr. Stack presented a resolution of regret that the Section must lose Col. Pope's active support and interest in its work, and Col. Pope responded briefly, expressing his regret in leaving Duluth.

Mr. William Knight, representative of the Allis-Chalmers Company, Duluth, Minn., the speaker of the evening, presented an interesting account of his personal experiences in the Archangel District of Russia during the World War, in which he served with the 310th Engineers.

Meeting of March 21st, 1921.

The Duluth Section held a regular meeting on March 21st, 1921; Vice-President J. L. Pickles in the chair; Walter G. Zimmermann, Secretary; and 17 members and 2 guests present.

Mr. W. H. Hoyt, who recently returned from a visit to Florida and Cuba, made a short address describing the trip. He outlined his impressions of Cuba in general and the City of Havana in particular, touching on industrial, agricultural, and financial conditions and describing the Cuban railways, Havana Harbor, the construction work in process of completion, the sugar situation, etc. He also described the route of the Florida East Coast Railway from Jacksonville to Key West, mentioning the developments in aeroplane traffic between Havana, Key West, and other Florida points.

Mr. W. E. Hawley offered a brief, but interesting, report of the Annual Meeting of the Parent Society in New York City, which he attended as the representative of the Section.

New York Section Considers Streets and Parks of the Metropolitan District

On March 16th, 1921, the New York Section considered the sixth topic in its programme of discussions bearing on the engineering development of the Metropolitan District, namely, "Streets and Parks". The subject was introduced by Mr. Chas. Wellford Leavitt, Landscape Engineer, and was discussed by Messrs. Arnold W. Brunner, President, Fine Arts Federation; Jay Downer, Engineer and Secretary, Bronx Parkway Commission; Frederick S. Greene, former Com-

missioner of Highways, State of New York; Charles Whiting Baker, Member, Palisades Park Commission; Palmer Campbell, Park Commissioner, Hudson County, New Jersey; Amos Schaeffer, Consulting Engineer to the President of the Borough of Manhattan; and George B. Ford, Consultant to the City Planning Commission, New York City.

Mr. Leavitt offered as four of the more important immediate problems: (1) Relief of vehicular and pedestrian traffic between 14th and 59th Streets, Manhattan; (2) provision for adequate connections between the five New York Boroughs and the outer country, and connection between the outlying towns; (3) provision for, and use of, adequate means of passenger transportation from congested areas to existing and future parks; and (4) provision for more small parks in the congested areas of New York, and the linking up of the large parks in the outlying districts with all the parks in the Metropolitan District, so far as possible.

Looking toward a solution of the first of these problems Mr. Leavitt proposed the construction of five elevated vehicular express ways between the existing north and south avenues, one such express way over an existing avenue, and a new avenue, making in all seven additional north and south thoroughfares. These express ways would be essentially for through traffic with ramp approaches at intervals of, say, ten blocks from the less traveled cross streets. He offered the excess condemnation principle as a solution of the cost problem that would have to be met.

Touching on the second point, Mr. Leavitt emphasized that all traffic that does not belong on the streets of New York should be removed from them, placing through traffic in subterranean passages by means of electrically driven vehicles. He cited three possible methods of pedestrian relief: Cutting streets through buildings to form arcades as in the Equitable Building; moving sidewalks back and setting store fronts under buildings from 15 to 20 ft. back as on the rue de Rivoli; forming rotundas, etc., beneath buildings, using the lower stories for pedestrian ways as in the basement of the Grand Central Station.

As to the park problem, Mr. Leavitt presented some interesting figures showing that in ratio of park area to population, New York is close to the foot of the list of American cities. He urged the prompt creation of a multiplicity of small parks distributed throughout the city. The existing parks, he declared, should be linked by parkways to be acquired in the outlying districts, which should, in turn, be joined by proper parkways with the proposed North River Bridge.

Mr. Brunner pointed out that our highway troubles commenced back in 1807 when the street plan was laid out with many cross streets and few avenues, the governing idea being to provide most effective access to the water front from the interior of the Island. He characterized the commissioners responsible for the plan, one of whom was Gouverneur Morris, as gentlemen who "left no mistake unmade," and declared that we are still hampered by the same "business reasons, the same false economy, the same lack of foresight, the same belief that the cost of property would never advance and the same want of confidence in our future". Mr. Brunner believed that it should be the privilege of the business man "to spend his life in a cheerful atmosphere in which positive beauty exists, as it does in Paris, for instance". He cited the Grand Central Station as an example of combined beauty and utility, and suggested that the ground floor of buildings may yet be devoted to public traffic.

Mr. Downer brought out clearly the necessity for a unifying agency that could initiate, consider, and carry out plans for the Metropolitan District park and parkway system. He used the work of the Metropolitan Park Commission of Boston to illustrate his points, citing instances. In connection with the details of the problem, he emphasized the need for beaches as a part of the Park System.

Mr. Greene agreed with Mr. Leavitt as to the need for more north and south streets, but questioned the wisdom of elevated structures as express ways. He believed that such structures would depreciate values beyond any increased valuation the added frontage might give. Mr. Greene describ d the splendid work that is being done in the Palisades Interstate Park in providing recreation camps with all facilities necessary to make them available to the poor and under-nourished who most need them.

Mr. Baker described at length the facilities and the operation of the Palisades Park, and showed many lantern slide illustrations.

Mr. Campbell believed that much of the congestion in New York City was due to the handling of merchandise that never should be brought into the city. As to the passenger congestion, he suggested a zoning plan to distribute activities throughout the city. Mr. Campbell then described the Park and Parkway System of Hudson County, New Jersey, and closed his discussion by indicating the value of a new city that will rise on the Jersey shores of the Hudson, and that will become the home of the overflow from Manhattan.

Mr. Schaeffer translated Mr. Leavitt's new express ways into dollars and cents and showed that the assessed valuation of the land required for all is about $275 000 000. As the city usually has to pay from 50 to 100% in excess of assessed value the property would cost from $412 000 000 to $550 000 000. If an extra 100 ft. were acquired on each side of the new streets, Mr. Schaeffer estimated that a capital of $1 236 000 000 to $1 650 000 000 would be required to buy the land. He believed that the possibility of the city's selling the excess land at a profit was debatable. As eight lots in each block would be lost for taxation and four interior lots in each block would become corner lots, he believed that the net result would show a decrease in taxable values rather an increase. He assumed that the salvage of the buildings would pay for razing them, leaving in addition to the above figure for acquisition of property the cost of the new structures to be raised.

Mr. Schaeffer estimated the cost of the express ways at $5 000 000 per mile, or $135 000 000 for the 27 miles. Grading and paving the lower level of the new avenues he estimated at $15 000 000, which together with the cost of land makes a grand total of $1 375 000 000 to $1 800 000 000 as the cost of the complete improvement. He stated that the present funded debt of the city for all non-revenue producing improvements such as this would be is $1 258 000 000, and the total funded debt including revenue producing improvements is $1 589 000 000.

Mr. Schaeffer believed that more immediate relief must be found by a study of local congestion and the application of remedies, and cited illustrations of how this has been accomplished at various points.

Mr. Ford emphasized the necessity of through investigation of city development problems and the determination of all the facts bearing thereon, leading to the necessity of co-ordinating not only the various departments of community development, but also neighboring communities themselves. He cited London, with a

Metropolitan Plan governing an area of more than a 1 000 sq. miles. Berlin and Paris also have worked out similar plans. Chicago is doing so, and Philadelphia has made a long step toward it. Boston has been considering it, but New York has not yet taken thought to the need for treating its many problems as one great problem. Mr. Ford described the French system of providing department commissions and a National Commission to harmonize the plans of adjoining villages, towns, and cities on the one hand, and of adjoining departments on the other, and expressed his belief that a similar plan could be made to work in this country.

Portland Section Holds Joint Meeting with Contractors

The regular meeting of the Portland Section scheduled for February 18th, 1921, was postponed in order to hold a joint meeting with the Associated General Contractors of the Pacific Northwest on February 23d, 1921. At this meeting 23 members, and about as many contractors, attended. President Reed acted as toastmaster, and conducted a general discussion of the common problems of contractors and engineers, with a view to reaching a better understanding. Frank criticism was freely offered on both sides, and it was generally agreed that the two groups should come together oftener for such conferences.

At a short business meeting, the following resolution was moved, duly seconded, and carried, and ordered transmitted to the Acting Secretary of the Parent Society and to all the other Sections:

"*Whereas,* the present practice of not publishing in full in the *Proceedings* the technical papers, and discussions thereon, accepted by the Committee on Publications for the *Transactions,* is in violation of the spirit of Section 11, Article VI of the Constitution which reads, 'Such papers as in the judgment of the Committee should appear in the *Transactions,* shall promptly, upon their acceptance, be printed and distributed to members of all grades', and

"*Whereas,* the principal direct benefit of membership in the Society, and for which dues are paid, is the receipt of technical papers and discussions thereon as rapidly as they accrue, and

"*Whereas,* the practice of the Society regarding its publications, which was in force for so many years until recently, was satisfactory in every particular, and

"*Whereas,* financial economy in Society affairs should be practiced to the utmost in other directions rather than in the fundamental matter of publication of technical papers and the discussions thereon, now, therefore,

"*Be it Resolved:* That we, the Portland Section, urge the Board of Direction to return with the least possible delay to the former practice regarding its publications, and

"*Be it Further Resolved:* That copies of this resolution be sent to all Sections of the Society with the request that each express to the Board of Direction its views regarding future publications, by wire if necessary, and so far as practicable before the meeting of the Board on March 7th, 1921."

February Meeting of the Seattle Section

The regular meeting of the Seattle Section was held at the Engineers Club on February 28th, 1921; President T. E. Phipps presiding, and 26 members and guests present.

The Committee appointed to report on the Smith Bill (H. R. 12 466) submitted a report favoring the bill which was read and approved, and copies were ordered to be sent to the Local Sections which had referred this matter to the Seattle Section, and also to the Montana Section.

A communication from the Portland Section regarding the present method of handling publications of the Parent Society was read and discussed. After a motion, duly seconded and carried, that the Section endorse the action of the Portland Section and that copies be sent to other Sections, the matter was referred to the Committee on Relationship to Parent Society.

A letter from Acting Secretary H. S. Crocker and a copy of a letter from Mr. J. Parke Channing sent to President-elect Harding requesting that an engineer be appointed on the Interstate Commerce Commission, were read. On motion, duly seconded, and carried, Mr. Crocker's suggestion was approved and the Section endorsed the action of Mr. Channing, and voted to send copies of this endorsement to the Congressmen from the district. Members were also requested to write to their Congressmen.

Mr. Bertram D. Dean, representing the Seattle Section on the Building Code revisions of the City of Seattle, reported progress, and was continued on this Commission.

A. H. Dimock, M. Am. Soc. C. E., City Engineer of Seattle, presented the address of the evening on the subject "The Swan Lake Impounding Reservoir". He described in considerable detail the preliminary work at Swan Lake, and suggested that later in the season a party of members from the Seattle Section should visit the project. Various phases of the subject were discussed by those present.

Regular Meeting of the Southern California Section

A regular meeting of the Southern California Section was held at the University Club, Los Angeles, Cal., on March 9th, 1921; Vice-President R. J. Reed in the chair; and present, also, 67 members and guests.

Secretary F. G. Dessery read letters dated March 3d and March 8th, 1921, from C. H. Lee, President of the State Water Commission, calling attention to the fact that a limited number of copies of the Third Biennial Report of the State Water Commission were now available to those interested. He also read a communication dated February 24th, 1921, from J. C. Whitman, Chief Examiner of State Civil Service Commission, requesting the Section to announce to its members the fact that a vacancy exists in the office of Chief Engineer, State Bureau of Architecture, and outlining the scope of the duties, salary, etc., connected with the position.

On motion, duly seconded, and carried, the report of the Committee on Unreinforced Concrete Pipe, presented by Chairman E. R. Bowen, was unanimously adopted.

A. L. Sonderegger, Chairman of the Committee on Co-operation with Federal Bureaus, reported that Senate Bill No. 194, now pending in the California Legislature, was intended to extend the scope of the work and results of the State Water Commission. This bill was read by the Secretary, and on motion, duly seconded, and carried, the latter was requested to send letters to local representatives in both branches of the State Legislature and to the Irrigation Committees of the Senate and Assembly, urging the passage of this bill, with the increased appropriation.

E. G. Sheibley, Chairman of the Public Library Committee, spoke at length on the work of the Los Angeles Public Library, urging the members to patronize the library and to suggest the names of technical books which should be added to its

collection, further pointing out the ability of the library to perform research work and to be of other service to the Profession.

In introducing the speaker of the evening, Alfred J. Salisbury, Jr., M. Am. Soc. C. E., who presented a paper entitled "Aerial Photographic Mapping and Surveying", Vice-President Reed outlined briefly the advances made in various fields of science during the war, and stated that many of these advances and improvements were only now beginning to be realized by the world at large. Mr. Salisbury outlined the historical development of the work done by the Army in aerial photography, the gradual progress made in the art, the scope of the work, and its many uses and great value to engineers and others.

With the assistance of his co-workers, Messrs. R. E. Haynes and R. M. Like, Mr. Salisbury presented many interesting views of this work, and explained in detail the methods of correcting and assembling the various individual pictures into large finished maps or mosaics. It was explained that these finished maps could be produced to any scale desired, and many individual and assembled views were shown.

Regular Meeting of the Spokane Section

A regular meeting of the Spokane Section was held at Spokane, Wash., on March 11th, 1921; Vice-President Garnett in the chair; and 12 members present.

The resolution of the Portland Section urging return to the former practice of publishing technical papers and discussions in the *Proceedings*, instead of the present distribution in pamphlet form, was discussed. It was the sense of the meeting that the Spokane Section concur in the Portland resolution.

ENGINEERING SOCIETIES SERVICE BUREAU

An Engineering Societies Service Bureau was established December 1st, 1918, as an activity of Engineering Council, managed by a board made up of the Secretaries of the four Founder Societies, funds for its maintenance being provided by these Societies. The Bureau is co-operating with engineering organizations in all parts of the country. It is desirous of increasing such co-operation by working with local engineering associations and clubs. Members of the American Society of Civil Engineers who desire to register with this Bureau should apply for further information, registration forms, etc., to Walter V. Brown, Manager, Engineering Societies Service Bureau, First Floor, Engineering Societies Building, 29 West 39th Street, New York City. In order to be included in the list published in *Proceedings,* copy must be received on or before the first Wednesday of each month. All communications should be addressed to Mr. Brown.

EMPLOYMENT BULLETIN

POSITIONS AVAILABLE

EXECUTIVE CIVIL ENGINEER. Must be able to assume full and responsible charge of entire department. Highest references essential. This position requires an organizer familiar with contract estimates, labor, inside and outside work. Application by letter considered. Location New York City. X–303.

TOPOGRAPHIC DRAFTSMEN. The United States Civil Service Commission states that there are openings in the Government service for copyist topographic draftsmen at entrance salaries of $900 to $2 000 a year, hydrographic and topographic draftsmen at entrance salaries of $1 600 to $2 000 a year, and junior topographers (topographic aids) at entrance salaries of $720 to $1 500 a year. In addition to the basic salaries, appointees whose services are satisfactory will be allowed the increase of $20 a month granted by Congress. Full information and application blanks may be obtained by communicating with the U. S. Civil Service Commission, Washington, D. C.

COMPUTERS, U. S. COAST AND GEODETIC SURVEY. The United States Civil Service Commission announces that examinations will be held on April 27th, and June 8th, 1921, to fill positions of computer in the U. S. Coast and Geodetic Survey, Washington, D. C. The usual entrance salary is $1 400 per year, plus the increase of $20 a month granted by Congress. Promotion to higher salaried positions will depend on demonstrated merit and needs of the service. Full information and application blanks may be obtained by communicating with the United States Civil Service Commission, Washington, D. C.

ASSISTANT CIVIL ENGINEER, U. S. NAVY. Applications are being received at the Bureau of Yards and Docks, Navy Department, Washington, D. C., to fill vacancies in the commissioned grade of Assistant Civil Engineer, Corps of Civil Engineers, U. S. Navy, with rank of Lieutenant (junior grade). The pay and allowances at entrance are approximately $3 200 per annum, with increase up to $9 600 depending on promotions in rank and length of service. The candidate must be an American citizen between the ages of 22 and 30 years on August 1st, 1921; must have received a degree in engineering; must have had not less than 20 months practical professional experience since graduation, and must be of good moral character and repute. The preliminary examination to determine general fitness will be based on papers submitted by the candidates reaching the Board on or before May 16th, 1921, covering college record, testimonials, references, and professional experience. The candidate is not required to report in person for the preliminary examination. Physical examination by a Board of Medical Examiners will be made of those candidates who qualify in the preliminary examination. Those who qualify in the preliminary and physical examinations will take the final oral and written examination, which will probably be held in New York, N. Y., Chicago, Ill., and San Francisco, Cal., depending on the number of applications from each locality, as soon as possible after the preliminary examination papers have been passed on by the Board. Officers of the Corps of Civil Engineers are detailed principally to the various Navy Yards and Naval Stations to supervise the work under the Bureau of Yards and Docks, consisting of design and construction of all the public works of the naval establishment on shore, as well as the maintenance and repair of existing structures. The work is exceptionally varied, and offers an attractive field for able and ambitious young engineers.

FIELD ENGINEERS, seven to ten years' experience; three to five years in charge. Well grounded in theory and practice of water works, location, filtration, design and construction in all its phases, familiar with location work, hydro-electric power work, heavy masonry construction, foundations, sewerage design, pumping machinery, etc. Should be eligible for Assoc. M. Am. Soc. C. E. Good physical condition. Appointments made under special contract for a period of two years. Location, Philippine Islands. Appointees furnished transportation from their place of residence in United States to Island and return. X–373.

ASSISTANT FIELD ENGINEER, five to seven years' experience; two to three years in charge. Should be eligible for Assoc. M. Am. Soc. C. E. Good physical condition. Appointments made under special contract for a period of two years. Location, Philippine Islands. Appointees furnished transportation from their place of residence in United States to Island and return. X–374.

MEN AVAILABLE.

CONSTRUCTION AND STRUCTURAL ENGINEER, M. Am. Soc. C. E.; age 43; married. Twenty-five years' experience; six years on design, balance on construction of sewers, subways, structural steel and reinforced concrete structures, and appraisal work. Has had responsible charge of large construction. Good organizer and executive. Prefer Eastern States. CE–117.

EXECUTIVE ENGINEER, graduate C. E., Assoc. M. Am. Soc. C. E.; age 42; speaks Spanish. Sixteen years' experience in investigations, design and construction of industrial plants, railroads, heavy foundations, tunnels and other subsurface structures, dock work and power plants. Especially proficient on design of reinforced concrete and steel. Qualified from past experience as designing resident engineer in charge of important work. Available on short notice. CE–118.

ASSOCIATE MEMBER, Am. Soc. C. E.; age 31; holding B. S. and C. E. degrees, experienced in municipal, highway, sewer and waterworks design, construction and operation, desires engagement in New York City or vicinity. CE–119.

ENGINEER, Assoc. M. Am. Soc. C. E.; age 32; single. Eight years' experience as assistant and resident engineer on construction, surveys, and design of hydro-electric developments, mill buildings, dams, etc. Lieutenant of Engineers, U. S. A., during war. Qualified as resident or construction engineer. Available at once. Location immaterial. CE–120.

CIVIL ENGINEER, age 27; single; Jun. Am. Soc. C. E. Graduate Civil Engineer, 1919. Two years' experience estimating and designing all classes of steel plate construction. Desires connection with engineering, contracting or manufacturing concern. Available on short notice. Location immaterial. CE–121.

EXECUTIVE, engineer, estimator, superintendent, foundations and superstructures of steel bridges; age 34; Assoc. M. Am. Soc. C. E. Twelve years' experience with contractors from structural iron worker to general superintendent and chief engineer. Possesses business ability, common sense, and thorough technical and practical experience. Thoroughly familiar with organization, equipment and rigging, sale and purchase of supplies and repairs. Most of experience on railroad bridges and open foundations. Has erected all types of lift bridges, and fixed and cantilever spans. Now employed as engineer, Secretary for one of the oldest established bridge builders in the country. Minimum salary $5 000, or willing to make percentage of profit arrangement. Location immaterial. Available now or later. CE–122.

CIVIL ENGINEER, graduate; Assoc. M. Am. Soc. C. E. Experience as Chief Engineer in charge of design and construction of irrigation systems, dams, and power plants. Location immaterial. CE–123.

CIVIL EXECUTIVE, Assoc. M. Am. Soc. C. E.; age 37. Twelve years' design experience and seven years' construction; six years in responsible charge. Water supply, sewerage, streets, town planning, railroad, waterfront, wharves, bulkheads, walls, tunnels, buildings, bridges, foundations, timber, steel, and reinforced concrete structures, surveying, property and other work. Tactful and able to get results. Wants permanent connection with responsibility and will go anywhere in the U. S. that affords good prospects. CE–124.

ENGINEER AND CONSTRUCTOR, M. Am. Soc. C. E.; age 44. Twenty-four years' experience as engineer, superintendent and executive in United States, Alaska, Canal Zone, and Peru, principally in charge of city improvements, river and harbor improvements, dredging, hydro-electric construction, irrigation, shipbuilding, dams, buildings, etc. Speaks Spanish. CE–125.

EXECUTIVE, Civil Engineer, age 38, possessing tact, business judgment, initiative. Fifteen years' experience in engineering and contracting on tunnels, railroads, subways, reinforced concrete structures, public utilities, piers, docks, buildings, highways and foundations. Initial salary subordinate to right kind of responsible connection. Now available. Go anywhere, but New York City location desired. CE–126.

CIVIL ENGINEER, age 28; Assoc. M. Am. Soc. C. E., Member American Concrete Institute. Capable executive. Experience includes surveys, architectural, reinforced concrete and structural design of buildings, design and construction of sewers, sewage disposal works and highway bridges; city planning, highway construction and maintenance; research, tests and reports. Recently Capt., Engrs., U. S. A. Was Asst. Plant Manager and Assistant Chief Engineer of rolling mill. Seven years' active practice; three years in responsible charge. Desires connection with engineering, contracting or manufacturing company, preferably in vicinity of Philadelphia. CE–127.

CIVIL ENGINEER, college graduate. Fifteen years' practical experience in design and construction of power developments, shops, industrial plants, housing propositions, reports, and purchase of materials. Highest references. Location immaterial. CE–128.

EXPERT STRUCTURAL ENGINEER wishes position in charge of structural department with leading architect, engineer or industrial corporation in New York City. CE–129.

CIVIL ENGINEER, age 33; married. Ten years' experience in structural and mechanical lines, including design and detail of coal handling and conveying plants and equipment, structural steel and sheet metal work for mill buildings, towers, trestles, breechings, etc. Also has had considerable experience in developing warped surfaces and skewed connections, as well as checking, estimating, inspecting and field superintendence of work engaged in. Assoc. M. Am. Soc. C. E. CE–130.

ASSOCIATE MEMBER, Am. Soc. C. E.; age 32; married. Fourteen years' varied experience in design and construction, desires position as assistant superintendent or field engineer; good draftsman; available one week's notice. CE–131.

EXECUTIVE ENGINEER, Assoc. M. Am. Soc. C. E. and Am. Soc. M. E.; age 37; married. Eighteen years' valuable experience in design and construction of industrial buildings, including complete layout of plant, structural features of buildings and entire mechanical equipment. Work has included power plants, chemical plants, manufacturing buildings, loft and storage buildings. Has worked up through various grades from draftsman to executive engineer in charge of important work. Available at once. CE–132.

CONSTRUCTION ENGINEER AND DESIGNER. Three years' municipal work, grading, paving, sewers and water supply; six years' railroad work, location, construction and maintenance; five years' industrial plant construction on design and erection of buildings, machinery, furnaces, power houses, etc. Available April 16th. Age 34; married. Assoc. M. Am. Soc. C. E. Good executive and organizer. CE–133.

CIVIL ENGINEER, technical graduate; age 35; M. Am. Soc. C. E. and Am. Soc. M. E. Four years' railway engineering and ten years' office and field experience on design and construction of railway and industrial plants and buildings. Executive work, purchasing, supervision, etc. Officer of Engineers, A. E. F. CE–134.

RECENT CORNELL GRADUATE in C. E. desires to get into the "industrial branch" of engineering, that is, purchasing and sales. Also interested in research or statistical work. CE–135.

SUPERVISING ENGINEER for architect or contractor. Executive for engineering, auditing or appraisal organization. Graduate C. E., M. Am. Soc. C. E. Twenty-five years' experience in all phases of building work along sound designing, constructive and managerial lines. Mentally alert, progressive, receptive, and an enthusiastic organization team-worker. Ability to analyze markets, expenditures, and policies, recruit, train and direct subordinates, and increase production with diminishing costs acknowledged and commended. Has initiative, enthusiasm, leadership, clean reputation, vision, pleasing personality and able to execute as well as plan. Position of responsibility desired rather than high initial salary. New York City location. CE–136.

CIVIL ENGINEER GRADUATE, twenty years' broad practical engineering and contracting experience on water-works, sewers, highways, hydraulics and general engineering, with utility holding companies, consulting engineers and contractors; investigations, design, construction, and appraisals. Will consider any proposition, engineering or associated work. Excellent references from all with whom ever associated. Prefers Middle Atlantic States for permanency. Eastern interview. CE–137.

CIVIL ENGINEER AND EXECUTIVE, M. Am. Soc. C. E.; age 46. Twenty-two years' experience, Philippines, Canal Zone, United States; in charge dredging, quarrying, water and rail transportation, construction locks, dams, breakwaters, residences, barracks, power plants, factories, streets. Officer, Engineer Corps, U. S. A., to 1916. Taught engineering; speaks Spanish. CE–138.

CIVIL ENGINEER, Junior at Rensselaer Polytechnic Institute with some experience in railroad engineering, desires work along this line for the summer. CE–139.

CONSTRUCTION ENGINEER, M. Am. Soc. C. E.; Yale graduate. Ten years as construction engineer in charge of railroad construction, work includes relocation of railroad, bridges, buildings and freight yards. Six years as superintendent of construction with railroad contractor; five years in charge of building industrial plants and power houses. Capable executive; able to direct as well as supervise construction work. Detail of experience on request, with references. Open for immediate engagement. CE–140.

JUNIOR, Rose Polytechnic Institute, available for summer work. Summer experience, Miami Conservancy District, 1919; Shourds-Stoner Engineering Co., 1920. CE–141.

SOPHOMORE, Rose Polytechnic Institute, desires summer work. Summer experience in mine and land surveying. CE–142.

SOPHOMORE, Rose Polytechnic Institute, desires summer work. Summer experience in railroad and architectural drafting. CE–143.

STUDENT of Rose Polytechnic Institute available for summer work. CE–144.

STUDENT of Rose Polytechnic Institute available for summer work. CE–145.

STUDENT of Rose Polytechnic Institute available for summer work. CE–146.

JUNIOR, Rose Polytechnic Institute, desires summer work. Experience as rodman with Realty Company; Instrumentman, State Highway Department; chief of party. CE–147.

JUNIOR, Rose Polytechnic Institute. Summer experience with County Surveyor. Desires summer work. CE–148.

CIVIL ENGINEER, age 42; Assoc. M. Am. Soc. C. E. Twenty-two years' experience. Eight years shop management, cost accounting, etc.; fourteen years construction work, surveying, estimating, drafting, building construction, steel and reinforced concrete, industrial plants, highways, sewers, tunnels, subways, bridges; six years on design. Prefers vicinity of New York. CE–149.

EXAMINATIONS FOR ENGINEERS' LICENSES

For the convenience of the membership, abstracts of the examination requirements of all States in which engineers are now required to obtain licenses before being allowed to practice, together with the addresses of the officers to whom application must be made, are repeated from the complete abstracts of the various laws now in force, as published in the October, 1920, *Proceedings,* as follows:

Colorado.—Each candidate is examined in that branch of engineering in which he is proficient, as set forth in his application. The Board conducts the examination in such manner as it deems best suited to determine the fitness of candidates, and it may summon any licensed engineer to assist in preparing for and in conducting examinations. Fee for examination is $10.00, for license certificate $5.00, and for renewal certificate, $5.00 annually. Application for examination is made to State Engineer, Secretary, State Board of Engineer Examiners, Denver, Colo.

Florida.—The Board has ruled that examinations may consist of the applicant's sworn statement of professional education and experience in responsible charge of engineering work. If this statement is not complete or qualifying, the Board may summon the applicant to appear for further examination, and investigate his record of professional service. Examinations may be either oral, or partly oral and partly written. Fee for examination is $15.00, for certificate of registration $10.00 additional, for registration without examination $25.00, and for renewal of certificate, $5.00 annually. Application for examination is made to the Secretary, State Board of Engineering Examiners, 215 East Bay Street, Jacksonville, Fla.

Idaho.—Examinations are held semi-annually in the State Capitol, Boise, Idaho, beginning at 9 A. M., the second Tuesday of March and September. Application must be received 10 days before the date of examination. Fee for residents is $10.00, for non-residents $25.00, for renewal, $2.00 annually. Application for a Certificate of Registration is made to the Department of Law Enforcement, Boise, Idaho, in writing under oath in such form and accompanied by such proof of the applicant's fitness to practice as the Department may from time to time prescribe. Must be accompanied by an unmounted photograph taken within a year.

Illinois.—Structural engineers' examinations include written and oral tests, and embrace subjects normally taught in schools of structural engineering. They occupy three days and cover theoretical and applied mechanics, definitions, general engineering knowledge, stress analysis, static and moving loads, design and construction in reinforced concrete, steel, wood, masonry, and foundations. Fee for examination $10.00, for certificate of registration $5.00, for examination to determine preliminary education $5.00, for restoration of an expired certificate $5.00, for renewal of certificate $1.00 annually, for certificate to those who hold a like certificate from another State or country, $15.00. Application for certificate is made upon prescribed blanks to the Department of Registration and Education, Springfield, Ill.

Iowa.—Examinations are required as prescribed by the Board. Fee for examination $15.00, for certificate of registration $10.00 additional, for certificate without examination to person registered in another State, $10.00. Application

for examination is made to the State Board of Engineering Examiners, Box 923, Des Moines, Iowa.

Louisiana.—Examinations are required of all who are not graduates of an engineering college or school of good standing. Examination for surveying covers geometry, plane trigonometry, plane surveying and practical use of instruments; for engineering, covers in addition, physics, including practical problems in design and construction. Fee for examination $25.00, for registration by diploma $25.00, for registration of holder of license from another State $15.00, for issuing license certificate $1.00, engineering renewal license $3.00 annually, surveying renewal license $1.00 annually. Application for license or examination is made to the State Board of Engineering Examiners, Maison Blanche Building Annex, New Orleans, La.

Michigan.—Examinations are required of all who desire to begin the practice of architecture, engineering or surveying as principal or in responsible charge, except those from other States, and include English language and other appropriate subjects. Fee for examination $5.00, for certificate of registration $15.00 additional, for certificate of registration without examination $20.00, for renewal of certificate $5.00 every five years. Application for examination is made to the State Board of Examiners for the Registration of Architects, Engineers, and Surveyors, 80 Griswold St., Detroit, Mich.

New York.—Present practitioners must obtain licenses before May 14th, 1922. If evidence presented in the application does not appear to the Board to be conclusive or warranting issuance of a certificate, applicant may present further evidence, which may include the result of a required examination. Fee for certificate to practice engineering or land surveying $25.00, for certificate to practice both engineering and land surveying $35.00; no provision for renewals. Application for certificate must be made on a prescribed form to Regents of the University of the State of New York, Albany, N. Y.

Oregon.—Examinations may be either oral or partly oral and partly written. Fee for examination $10.00, for certificate of registration $5.00 additional, for certificate of registration without examination $15.00. Application for examination is made to the Secretary, State Board of Engineering Examiners, Corbett Building, Portland, Ore.

Virginia.—Examinations are required of all applicants except those from other States, as prescribed. They are held at least once each year at Richmond, Va., and at such other places and times as the Board may designate. Fee for each examination $20.00. Application for examination is made to the State Board of Examination and Certification of Architects, Professional Engineers, and Land Surveyors, Richmond, Va. Registration is optional; present practitioners are not limited as to time within which to register.

Wyoming.—Examinations are required of all applicants except those licensed under previous Acts, and consist of a written examination and an investigation by the Board of record, training, and experience. Fee for examination $10.00, for certificate of license without examination $5.00. Application for examination is made to the State Board of Examining Engineers, Cheyenne, Wyo.

ANNOUNCEMENTS

The Reading Room of the Society is open from 9 A. M. to 6 P. M., and from 7 P. M. to 10 P. M., every day, except Sundays, New Year's Day, Washington's Birthday, Memorial Day, Fourth of July, Labor Day, Thanksgiving Day, and Christmas Day; during July and August, it is closed at 6 P. M.

FUTURE MEETINGS

May 4th, 1921.—8 P. M.—A regular business meeting will be held, and a paper by Ernest E. Howard, M. Am. Soc. C. E., entitled "Vertical Lift Bridges", will be presented for discussion.

SECOND MEETINGS OF THE MONTH

Under authority given by the Board of Direction at its meeting of August 9th, 1920, the Acting Secretary has made an arrangement with the New York Section whereby the latter will take over the second meeting of the month, and will thus hold its own meetings on the third Wednesday of each month, except January and May, when they are held on the second Wednesday.

The programmes announced by the New York Section* are similar to those heretofore offered by the Society's Committee on Second Meeting of the Month, and it is understood that all members of the Society are invited to attend the meetings regardless of whether or not they may be members of the Section. This arrangement gives each member the same privilege of attendance at meetings which he has heretofore enjoyed, and is deemed especially desirable since there has been considerable doubt as to the attendance that might develop at the several meetings if three were held in each month.

REGULATIONS FOR STUDENT CHAPTERS

1.—A Student Chapter in affiliation with the American Society of Civil Engineers, composed of students of schools of engineering of recognized reputation, may be organized upon favorable vote by the Board of Direction. The name of such an affiliated society shall be "The.....† Student Chapter of the American Society of Civil Engineers."

2.—The qualifications required of a proposed Student Chapter shall include:

(*a*).—An organization of students in an engineering school of high standing;

(*b*).—The endorsement of the application by the head of the civil engineering department;

(*c*).—A minimum membership of twenty students.

3.—Each Student Chapter shall establish its own rules of government and procedure, which shall conform with any regulations which may be formulated by the American Society of Civil Engineers. It is also intended that each Student Chapter shall control the occurrence and character of its own meetings; but the American Society of Civil Engineers desires especially to aid in promoting the success and value of student chapters by frequent consultations and advice, as well as by arranging for speakers, on request, whose addresses will broadly supplement

* *Proceedings*, Am. Soc. C. E., November, 1920, p. 868.

† Insert the name of the educational institution at which the particular student chapter is situated; for example, "Stanford University".

the class-work of the members. Each Student Chapter is authorized to communicate direct with the Local Section or local members in whose territory it is situated, to arrange for speakers and for other co-operation.

4.—Each Student Chapter shall submit an annual report, not later than the last day of December of each year, which shall include

(*a*).—A summary statement of the meetings held during the calendar year; giving the date of each, the attendance, the principal speaker and his subject, and other pertinent information;

(*b*).—Names of the officers, and of the members by classes, at the date of the report.

5.—Any address or paper read before a Student Chapter may be offered for publication to the American Society of Civil Engineers under the general provisions established for this procedure, and shall be submitted to the Board of Direction when requested by the said Board or when such Chapter desires to publish it in a local journal or elsewhere; it being understood that the privilege of priority in publication exists in the American Society of Civil Engineers, though the Society claims no exclusive copyright upon such papers.

6.—The annual dues of each Student Chapter shall be $10.00 per year, which, under provisions approved by the Board of Direction, shall entitle it to the following:

(*a*).—A copy of each issue of the *Proceedings* of the American Society of Civil Engineers and of all papers;

(*b*).—The opportunity to publish notices of its chapter activities, etc., in publications of the American Society of Civil Engineers;

(*c*).—The active co-operation of the American Society of Civil Engineers in advancing the interests of each Student Chapter by contributing (from its organization, membership, and experience) such service as may be mutually arranged.

The annual dues shall apply to the current fiscal year and shall be payable in advance, due January 1st. The Secretary of the American Society of Civil Engineers shall send out bills for dues each December for the following year. Student Chapters admitted on or after July 1st of each year shall pay $5.00 only for the balance of the current fiscal year.

7.—Among the privileges offered to the members of Student Chapters are:

(*a*).—Individual subscription to the *Proceedings* of the American Society of Civil Engineers at a special price of $3.00 per year;

(*b*).—To receive at cost, on request, copies of such separate papers as may be printed in pamphlet form;

(*c*).—To use on all official stationery the special official emblem, prescribed in Section 8;

(*d*).—A membership card, of special design, prescribed in Section 9, to be issued annually;

(*e*).—The right to attend the meetings and accompany inspection trips and excursions arranged for members of the American Society of Civil Engineers;

(*f*).—Provision for the publication of requests for summer employment during the college course, or for permanent engagement after graduation, on such terms as the Board of Direction may prescribe; and

(*g*).—The opportunity to hear, on special occasions, speakers whose personal experiences qualify them to speak with authority upon the many questions which are of particular importance to the student during his college course.

8.—The official emblem for stationery for Student Chapters shall be in strict accord with a standard design, as prescribed by the Board of Direction.

9.—The membership cards shall be supplied and signed by the Secretary of the American Society of Civil Engineers, in accordance with official annual lists furnished by the Secretaries of the Student Chapters.

10.—Applications for admission of Student Chapters to the American Society of Civil Engineers shall be in the following form:

.....
(*Place.*)

.....
(*Date.*)

"To the Board of Direction,
American Society of Civil Engineers.

"Gentlemen: The.....hereby make application for affiliation with the American Society of Civil Engineers as a Student Chapter, under the terms prescribed by the Board of Direction.

"In regard to the qualifications required of a proposed Student Chapter, we submit the following:

"(*a*).—This.....is composed of.....
(*Seniors, Juniors, Sophomores, Freshmen.*)
..... It was organized.....
(*Date.*)

"(*b*).—Our application for affiliation is herewith endorsed by.....
.....Head of the Department of Civil Engineering.

"(*c*).—There are at present.....active members of this organization.
(*Number.*)

Respectfully yours,

.....
Secretary.

"Endorsed:

.....
"Head of Civil Engineering Department.

.....
"Name of Educational Institution."

11.—A Student Chapter may be disbanded upon the approval of the Board of Direction provided its annual dues for the current calendar year have been paid.

The Board of Direction may discontinue a Student Chapter if its annual dues are not paid promptly, or if it becomes inactive, or if its continuance is considered not for the best interest of the Society.

RULES ADOPTED BY THE BOARD OF DIRECTION FOR THE USE OF THE ADDRESSOGRAPH AND MAILING LIST OF THE SOCIETY

The following rules were adopted by the Board of Direction at its meeting of November 9th, 1920, for the use of the Addressograph and Mailing List of the Society:

1.—The Addressograph shall be used by the Secretary only in the routine of the issuance of Society matter and for the issuance of notices of joint meetings of this and other societies.

2.—The Mailing List shall be furnished by the Secretary:

(*a*) To Local Sections of the Society free of charge for legitimate use by them in relation to Society matters, and

(*b*) To individual members of the Society at cost price for their communication with the membership regarding Society affairs.

3.—Neither Mailing List nor the use of the Addressograph shall be furnished to any one for commercial or advertising purposes.

4.—In the difficulty of prescribing rules to cover each case that may arise in the future, the Secretary is authorized to use his discretion regarding each application as to whether it is in accordance with the spirit of the rules here outlined.

5.—These rules shall be published in the *Proceedings* of the Society so that all members may have an equal chance to avail themselves of the advantages of the use of the Mailing List.

SEARCHES IN THE LIBRARY

As the Library of the American Society of Civil Engineers has been merged in the Engineering Societies Library, requests for searches, copies, translations, etc., should be addressed to the Director, Engineering Societies Library, 29 West 39th Street, New York City, who will gladly give information concerning the charges for the various kinds of service. A more comprehensive statement in regard to this matter will be found on page 21 of the Year Book for 1921.

PAPERS AND DISCUSSIONS

Members and others who take part in the oral discussions of the papers presented are urged to revise their remarks promptly. Written communications from those who cannot attend the meetings should be sent in at the earliest possible date after the issue of a paper. Written discussion on a given paper will be closed three months after the paper has been published, so that the author's closure can be printed four months after the paper, and the discussions and closure distributed in pamphlet form.

All manuscript submitted for publication should preferably be typewritten, and always double spaced. Drawings and diagrams should be on separate sheets, drawn to a scale suitable for about one-half to one-fourth reduction.

All papers accepted by the Publication Committee are classified by the Committee with respect to their availability for discussion at meetings.

Papers which, from their general nature, appear to be of a character suitable for oral discussion will be set down for presentation to a future meeting of the Society, and, on these, oral discussions, as well as written communications, will be solicited.

All papers which do not come under this heading, that is to say, those which from their mathematical or technical nature, in the opinion of the Committee, are not adapted to oral discussion, will not be scheduled for presentation to any meeting. Such papers will be published in the same manner as those which are to be presented at meetings, but written discussions only will be requested for subsequent publication and with the paper in the volumes of *Transactions*.

The Board of Direction has adopted rules for the preparation and presentation of papers, which will be found on page 36 of the Year Book for 1921.

LOCAL SECTIONS OF THE AMERICAN SOCIETY OF CIVIL ENGINEERS

San Francisco Section, Organized 1905.

Frederick R. Muhs, President; Nathan A. Bowers, Secretary-Treasurer, 531 Rialto Building, San Francisco, Cal.

Bi-monthly meetings are held at 6 P. M., at the Engineers' Club, 57 Post Street, on the third Tuesday of February, April, June, August, October, and December, the last being the Annual Meeting. Informal luncheons are held at noon, every Wednesday, at the Engineers' Club. All members of the Society will be gladly welcomed.

Colorado Section, Organized 1908.

Oliver T. Reedy, President; John S. Means, Secretary-Treasurer, 1574 Marion Street, Denver, Colo.

Meetings are held on the second Monday of each month, except July and August, usually preceded by an informal dinner. Weekly luncheons are held on Wednesday, at 12.30 P. M., at Daniels and Fisher's. Visiting members of the Society are urged to attend.

Atlanta Section, Organized 1912.

J. T. Wardlaw, President; R. S. Fiske, Secretary-Treasurer, 1530 Healey Building, Atlanta, Ga.

Informal luncheons are held on the last Monday of each month, at 12.30 P. M., to which visiting members of the Society are welcome.

Baltimore Section, Organized 1914.

Ezra B. Whitman, President; George S. Robertson, Sr., Secretary-Treasurer, 1628 Linden Avenue, Baltimore, Md.

Buffalo Section, Organized 1921.

A. L. Johnson, President; Bruce L. Cushing, Secretary-Treasurer, 80 West Genesee Street, Buffalo, N. Y.

Central Ohio Section, Organized 1921.

F. H. Eno, President; H. D. Bruning, Secretary, 935 Madison Avenue, Columbus, Ohio.

Meetings are held at the rooms of the Engineers Club of Columbus in the Southern Hotel. The Annual Meeting is held on the second Friday of November and at least two other meetings are held each year the dates of which are designated by the Board of Direction of the Section.

Cincinnati Section, Organized 1920.

Edgar Dow Gilman, President; Alphonse M. Westenhoff, Secretary, 9 East Third Street, Cincinnati, Ohio.

Cleveland Section, Organized 1914.

J. E. A. Moore, President; George H. Tinker, Secretary-Treasurer, 516 Columbia Building, Cleveland, Ohio.

Regular meetings are held on the second Wednesday of each month, at 12.15 P. M., in the Rooms of the Cleveland Engineering Society, Hotel Statler. Luncheon is served, and all visiting members of the Society are invited to attend.

Connecticut Section, Organized 1919.

Charles Rufus Harte, President; Clarence M. Blair, Secretary-Treasurer, 785 Edgewood Avenue, New Haven, Conn.

The Annual Meeting is held in April; fortnightly meetings alternate between Hartford and New Haven, Conn. These meetings are informal luncheon gatherings, held usually at noon on Saturday. Members are privileged to invite guests regardless of their affiliation as engineers.

Detroit Section, Organized 1916.

David A. Molitor, President; Dalton R. Wells, Secretary-Treasurer, 624 McKerchey Building, Detroit, Mich.

Regular meetings are held on the second Friday of December, April, and October, the last being the Annual Meeting.

District of Columbia Section, Organized 1916.

John C. Hoyt, President; James H. Van Wagenen, Secretary-Treasurer, 2001 Sixteenth Street, N. W., Washington, D. C.

Duluth Section, Organized 1917.

W. A. Clark, President; Walter G. Zimmermann, Secretary, 203 Wolvin Building, Duluth, Minn.

Regular meetings are held at noon on the third Monday of each month, usually at the Kitchi Gammi Club, to which visiting members of the Society will be welcomed. The Annual Meeting is held on the third Monday in May.

Illinois Section, Organized 1916.

Charles B. Burdick, President; W. D. Gerber, Secretary-Treasurer, 913 Chamber of Commerce, Chicago, Ill.

Regular meetings are held on the second Monday of March, June, September, and December, the last being the Annual Meeting.

Iowa Section, Organized 1920.

C. S. Nichols, President; R. W. Crum, Secretary, Care, Iowa State Highway Commission, Ames, Iowa.

Louisiana Section, Organized 1914.

A. T. Dusenbury, President; Eugene F. Deléry, Secretary, 602 Sewerage and Water Board Building, New Orleans, La.

Regular meetings are held at The Cabildo, New Orleans, La., on the first Monday of January, April, July, and October.

Nashville Section, Organized 1921.

Arthur J. Dyer, President; Granbery Jackson, Secretary-Treasurer, 220 Capitol Boulevard, Nashville, Tenn.

Nebraska Section, Organized 1917.

Rodman M. Brown, President; Homer V. Knouse, Secretary-Treasurer, 200 City Hall, Omaha, Nebr.

Regular meetings are held on the first Saturday of each month, except July and August. The Annual Meeting is held in Lincoln, Nebr., on the second Friday in January. Visiting members of the Society are especially urged to communicate with the Secretary when in the city.

New York Section, Organized 1920.

William J. Wilgus, President; W. T. Chevalier, Secretary, 17 Battery Place, New York City.

Regular meetings are held in the Engineering Societies Building, 29 West 39th Street, New York City, on the third Wednesday of each month, except January and the Annual Meeting in May, held on the second Wednesday of the month.

Northwestern Section, Organized 1914.

Charles L. Pillsbury, President; Paul C. Gauger, Secretary, 945 Osceola Ave., St. Paul, Minn.

Meetings are held bi-monthly, alternating between St. Paul and Minneapolis, on the third Friday of each month.

Oklahoma Section, Organized 1920.

H. V. Hinckley, President; R. E. Brownell, Secretary-Treasurer, 402 First National Bank Building, Oklahoma, Okla.

Philadelphia Section, Organized 1913.

John Meigs, President; S. C. Hollister, Secretary, 1200 Land Title Building, Philadelphia, Pa.

Regular meetings are held at the Engineers' Club on the first Monday in January, April, and October, the last being the Annual Meeting. Special meetings are also held at times announced in advance.

Pittsburgh Section, Organized 1917.

N. S. Sprague, President; Nathan Schein, Secretary-Treasurer, 426 City-County Building, Pittsburgh, Pa.

Portland (Ore.) Section, Organized 1913.

M. E. Reed, President; C. P. Keyser, Secretary, 318 City Hall; Portland, Ore.

Meetings are held regularly on the third Friday of each month. All members of the Society in any grade are cordially invited to attend.

Providence (R. I.) Section, Organized 1920.

Sidney Wilmot, Chairman; Howard W. Congdon, Secretary-Treasurer, Care, Providence Steel and Iron Company, Providence, R. I.

The Section regularly holds meetings jointly with the Structural and Municipal Sections of the Providence Engineering Society, at the Society Rooms, 29 Waterman Street, on the fourth Tuesday of each month, from September to May. The Annual Meeting is held in May. All visiting members of the Society are cordially invited to attend these meetings.

St. Louis Section, Organized 1888 (Constitution Approved by Board, 1914).

William S. Mitchell, President; W. R. Crecelius, Secretary-Treasurer, 301 City Hall, St. Louis, Mo.

The Annual Meeting is held on the fourth Monday in November. Two meetings each year for the presentation and discussion of technical papers are held in the Auditorium of the Engineers' Club, and are open to members of the Associated Societies. Other "get-together" meetings are held regularly for dinner or luncheon on the fourth Monday of each month except July, August, and November.

San Diego Section, Organized 1915.

George Cromwell, President; R. C. Wueste, Secretary-Treasurer, Bonita, Cal.

The San Diego Section of the American Society of Civil Engineers meets on announcement. Pilgrimages to points of engineering interest are made at intervals throughout the year.

Seattle Section, Organized 1913.

T. E. Phipps, President; Frank H. Fowler, Secretary-Treasurer, 1319 L. C. Smith Building, Seattle, Wash.

Regular meetings, with luncheon, are held at the Engineers' Club, on the last Monday of each month. All members in any grade of the Society are cordially invited to attend, and if located in this District for any length of time, their membership in the Section will be appreciated.

Southern California Section, Organized 1914.

H. W. Dennis, President; Floyd G. Dessery, Secretary, 619 Central Building, Los Angeles, Cal.

Regular monthly meetings are held on the second Wednesday of each month, the Annual Meeting in December. Informal luncheons in connection with the Joint Technical Societies of Los Angeles are held at 12.15 P. M., every Thursday at the Broadway Department Store Café.

Spokane Section, Organized 1914.

E. G. Taber, President; Charles E. Davis, Secretary-Treasurer, 401 City Hall, Spokane, Wash.

Meetings are held on the second Friday of each month. These meetings are noonday luncheons at Davenport's, and all visiting members of the Society are invited to attend.

Texas Section, Organized 1913.

J. H. Brillhart, President; E. N. Noyes, Secretary, 311 Deere Building, Dallas, Tex.

Utah Section, Organized 1916.

A. B. Villadsen, President, 304 Dooly Bldg., Salt Lake City, Utah.

The Annual Meeting is held on the first Wednesday in April. The time of other meetings is not fixed, but this information will be furnished on application to the President.

STUDENT CHAPTERS OF THE AMERICAN SOCIETY OF CIVIL ENGINEERS

Stanford University Student Chapter, Organized 1920.

R. L. Wing, President; U. B. Gilroy, Corresponding Secretary, Stanford University, Cal.

Alabama Polytechnic Institute Student Chapter, Organized 1921.

Alfred D. Boyd, Secretary, Alabama Polytechnic Institute, Auburn, Ala.

Braune Civil Engineering Society (University of Cincinnati) Student Chapter, Organized 1920.

Clinton H. Wood, President; H. J. Miller, Secretary of Section I; Alvord C. Stutson, Secretary of Section II; University of Cincinnati, Cincinnati, Ohio.

Civil Engineering Society of Rensselaer Polytechnic Institute Student Chapter, Organized 1920.

E. C. Larson, President; T. W. Broughton, Secretary, 2165 Fourteenth Street, Troy, N. Y.

Drexel Institute Student Chapter, Organized 1920.

Miles N. Clair, Chairman; C. V. Nishwitz, Secretary, Drexel Institute, Philadelphia, Pa.

Iowa State College Student Chapter, Organized 1920.

Alfred W. Warren, Secretary, Iowa State College, Ames, Iowa.

Johns Hopkins University Student Chapter, Organized 1921.

Eric M. Arndt, President; Melvin E. Scheidt, Secretary, Box 566, Homewood, Baltimore, Md.

Massachusetts Institute of Technology Student Chapter, Organized 1921.

T. H. Gill, Secretary, Massachusetts Institute of Technology, Cambridge, Mass.

New York University Student Chapter, Organized 1921.

William J. Kiehnle, President; George H. Martin, Jr., Secretary, New York University, University Heights, New York City.

Pennsylvania State College Student Chapter, Organized 1920.

Arthur H. McFadden, President; William W. Seltzer, Secretary, Pennsylvania State College, State College, Pa.

Polytechnic Institute of Brooklyn Student Chapter, Organized 1921.

Richard Kanegsberg, Secretary, Polytechnic Institute of Brooklyn, Brooklyn, N. Y.

Purdue University Student Chapter, Organized 1921.

Donald A. Leach, President, 208 Fowler Avenue, West Lafayette, Ind.

Rose Polytechnic Institute Student Chapter, Organized 1921.

Kenneth L. De Blois, President; Duncan Baker, Secretary, 1606 North 8th Street, Terre Haute, Ind.

Rutgers College Student Chapter, Organized 1921.

Arthur E. Hilliard, Secretary, Winants Hall, Rutgers College, New Brunswick, N. J.

State University of Iowa Student Chapter, Organized 1921.

C. E. Stickney, Secretary, State University of Iowa, Iowa City, Iowa.

University of Colorado Civil Engineering Society Student Chapter, Organized 1920.

W. C. Peterson, President; D. H. McNeal, Secretary, 1205 Thirteenth Street, Boulder, Colo.

University of Kansas Student Chapter, Organized 1921.

B. C. Judkins, President; Seth P. Kingman, Secretary, 1125 Kentucky Street, Lawrence, Kans.

University of Kentucky Student Chapter, Organized 1921.

B. O. Bartee, Secretary, University of Kentucky, Lexington, Ky.

University of Pennsylvania Student Chapter, Organized 1920.

Ashby B. Paul, President; Robert Beatty, Secretary, University of Pennsylvania, Philadelphia, Pa.

University of Pittsburgh Student Chapter, Organized 1921.

W. E. Marshall, President; Paul H. Young, Secretary, University of Pittsburgh, Pittsburgh, Pa.

University of Texas Student Chapter, Organized 1921.

Ralph S. Windrow, President; Luis Tinoco, Secretary, University of Texas, Austin, Tex.

University of Washington Student Chapter, Organized 1921.

G. B. Richardson, President; Grace Eugenie Morrill, Secretary, University of Washington, Seattle, Wash.

University of Wisconsin Student Chapter, Organized 1921.

Herbert Wheaton, President; Olaf N. Rove, Secretary, University of Wisconsin, Madison, Wis.

Virginia Military Institute Student Chapter, Organized 1921.

Benjamin F. Parrott, Secretary, Virginia Military Institute, Lexington, Va.

Washington University Collimation Club Student Chapter, Organized 1920.

Harold T. Smutz, President; Raymond Schuermann, Secretary, Washington University, St. Louis, Mo.

Yale University Student Chapter, Organized 1921.

W. G. Geile, President; P. W. Thompson, Secretary, Winchester Hall, New Haven, Conn.

MINUTES OF MEETINGS OF SPECIAL COMMITTEES TO REPORT UPON ENGINEERING SUBJECTS

Special Committee on Stresses in Railroad Track

March 16th, 1921.—The meeting was called to order at the Congress Hotel, Chicago, Ill. Present, Messrs. Talbot (Chairman), Bremner, Bronson (representing Dudley), Brunner, Cushing, Gennett (representing Hunt), Jenkins, La Bach, Larrson, Reichmann, Stimson, and Willoughby. Messrs. Baldwin and Churchill who were called away before the meeting, had presented their views the day before. Letters from several members of the Committee giving views and suggestions were also received.

A long discussion of the programme of the work of the Committee was participated in by the members present, and the Chairman reported the progress of the experimental work.

It was voted to ask the Chairman to formulate the results along the lines outlined in the discussion.

PRIVILEGES OF ENGINEERING SOCIETIES EXTENDED TO MEMBERS OF THE AMERICAN SOCIETY OF CIVIL ENGINEERS

Members of the American Society of Civil Engineers will be welcome in the Reading Rooms and at the meetings of many engineering societies in all parts of the world. A list of such societies will be found on pages 48, 49, and 50 of the Year Book of the Society for 1921.

NEW BOOKS*

(From March 1st to March 31st, 1921)

The statements made in these notices are taken from the books themselves, and this Society is not responsible for them.

DONATIONS TO ENGINEERING SOCIETIES LIBRARY

A TEXTBOOK OF ELECTRICAL ENGINEERING.

By Adolf Thomälen. Translated by G. W. O. Howe. Fifth Edition. Lond., Edward Arnold, 1920. 482 pp., diagrams, 9 x 6 in., cloth. $9.00. (Gift of Longmans, Green and Company.)

This book is designed to bridge the gap between elementary textbooks and the specialized works on various branches of electrical engineering. It is concerned almost exclusively with principles and does not enter into details of the practical construction of apparatus and machines. It is intended to lay a thorough foundation for the profitable study of books on the design of dynamo machinery. The present edition has been revised, extended, and partly rewritten.

PRINCIPLES OF ELECTRICAL DESIGN, D. C. AND A. C. GENERATORS.

By Alfred Still. Second Edition. N. Y. and Lond., McGraw-Hill Book Co., Inc., 1921. 365 pp., diagrams, 9 x 6 in., cloth. $3.50.

This book is intended for students of electrical engineering, and for this reason emphasis is laid on fundamentals and principles of general application, while little attention is given to the need of the practical designer for empirical formulas and short cuts. The author's object has been to supply a reference text to accompany a course in practical designing, which would base all arguments on scientific facts and build up designs in a logical manner from known fundamental principles and thus assist in a thorough understanding of the essentials. The revision covers many minor alterations and corrections and a few new methods of calculation.

ELECTRICAL MACHINERY.

By Ottomar H. Henschel. Chicago, Power Plant Engineering, copyright 1920. 312 pp., illus., 8 x 5 in., cloth. $2.00.

This volume is an elementary statement of the generally accepted theories of the principles of of electric machinery, presented with the aid of only elementary mathematics. Direct-and alternating-current generators and motors, transformers, voltage regulators, and rotary converters are considered. The book is based on a series of articles, entitled "A Study of Dynamo Electric Machinery", which appeared in *Power Plant Engineering*.

ELECTRIC WELDING.

By Ethan Viall. N. Y. and Lond., McGraw-Hill Book Co., Inc., 1921. 417 pp., illus., 9 x 6 in., cloth. $4.00.

This volume is a compilation of the available literature on electric welding, selected and arranged by an experienced editor. It forms a convenient source of information on present methods, apparatus, and applications. Contents: Electric Welding; Historical; Arc Welding Equipment; Different Makes of Arc Welding Sets; Training Arc Welders; Carbon-Electrode Arc Welding and Cutting; Arc Welding Procedure; Arc Welding Terms and Symbols; Examples of Arc-Welding Jobs; Physical Properties of Arc-Fused Steel; Metallography of Arc-Fused Steel; Automatic Arc Welding; Butt-Welding Machines and Work; Spot Welding Machines and Work; Welding Boiler Tubes by the Electric Resistance Process; Electric Welding of High-Speed Steel and Stellite in Tool Manufacture; Electric Seam Welding; Making Proper Rates for Electric Welding, and the Strength of Welds.

MARINE ENGINEERING.

By A. E. Tompkins. Fifth Edition, Revised. Lond., Macmillan and Co., Ltd., 1921. 888 pp., illus., 9 x 6 in., cloth. $11.25. (Gift of The Macmillan Co., N. Y.)

An extensive one-volume textbook covering a sound course in marine engineering, treating of all the subjects usually included in that term. This edition has been extensively revised and many chapters have been rewritten. Much obsolete matter has been omitted and mercantile practice has been considered more fully than before.

* Unless otherwise specified, books in this list have been donated by the publishers.

MODERN MARINE ENGINEERING: PART 1, THE FIRE ROOM.

By Harry G. Cisin. N. Y., D. Van Nostrand Co., 1921. 205 pp., illus., tab., 8 x 5 in., cloth. $3.00.

The purpose of the textbook, of which this is the first volume, is to set forth present practice in marine engineering in a form suitable as a college text or for use by practical men preparing for engineers' licenses. This volume discusses marine boiler construction, auxiliaries, corrosion, fuels, and combustion. It is based on the course given by the U. S. Navy Steam Engineering School at Stevens Institute, during the war.

BELTS FOR POWER TRANSMISSION.

By W. G. Dunkley. (Pitman's Technical Primer Series.) Lond. and N. Y., Sir Isaac Pitman & Sons, Ltd. 104 pp., diagrams, 7 x 4 in., boards. $1.00.

This is a small volume, for students and designers, presenting and discussing the factors and considerations involved in belt driving. Tables of use to designers are included. Contents: Belt Materials and Types of Belts; Power Transmitted by Belts; The "Lenix" System of Belt Driving; Length of Belts; Steel Belts.

SCREW THREAD PRODUCTION TO CLOSE LIMITS.

By Howard E. Adt. N. Y., The Stirling Press, 1920. 192 pp., illus., tab., 9 x 6 in., cloth. (Gift of the Geometric Tool Co., New Haven, Conn.)

The volume is intended primarily to direct attention to the screw-cutting tools and machines manufactured by the Geometric Tool Company. It contains much general information of a practical character on screw-thread standards, gauging, methods of threading, cutting speeds, lubricants, and similar subjects of general application, and includes the necessary tables, so that it will be useful to machinists as a reference book.

KINEMATICS AND KINETICS OF MACHINERY;

A Textbook for Colleges and Technical Schools. By John A. Dent and Arthur C. Harper. N. Y., John Wiley & Sons, Inc.; Lond., Chapman & Hall, Ltd., 1921. 383 pp., illus., tab., 9 x 6 in., cloth. $3.50.

This treatise gives systematic methods, mainly graphical, of determining velocities, accelerations, and inertia forces which can be applied to practically all mechanisms. The text is based on notes prepared by Professors G. A. Goodenough and F. B. Seeley, and used for instruction at the University of Illinois, which have been revised and extended by the authors. Contents: Machine Motions, Pairs, Links, Chains, Mechanisms; Motion of Rigid Bodies; Velocities of Mechanisms; Accelerations in Mechanisms; Inertia Forces of Machine Parts; Balancing of Engines; Governors; The Mechanics of the Gyroscope; Critical Speeds and Vibrations; Toothed Wheels; Cams; Wrapping Connectors; Irregular Gears; Propositions on Velocity Polygons; Locus of the Center of Acceleration; Solution of Linear Differential Equations; Investigation of Forces in Gasoline Engine.

ELEMENTS OF FUEL OIL AND STEAM ENGINEERING.

By Robert Sibley and C. H. Delany. Second Edition. N. Y. and Lond., McGraw-Hill Book Co., Inc., 1921. 466 pp., illus., tab., 9 x 6 in., cloth. $5.00.

The theme of this book is a study of fuel-oil power-plant operation and the use of evaporative tests to increase their efficiency. It includes an exposition of the elementary laws of steam engineering, the use of oil for fuel in the modern power plant, and the testing of oil-fired boilers. This edition has been rewritten and much new material added.

ELEMENTARY MACHINE SHOP PRACTICE.

By James A. Pratt. N. Y., D. Van Nostrand Co., 1921. 320 pp., illus., 8 x 5 in., cloth. $2.50.

This manual describes the fundamentals of the trade, the process relating to the bench, lathe, drill press, shaper, slotter, grinder, miller, and planer. The treatment is clear, detailed and non-mathematical, suited for use by apprentices, trade school students, and young workmen.

A TREATISE ON AIRSCREWS.

By Whyrill E. Park. (The Directly Useful Technical Series.) N. Y., E. P. Dutton & Co., 1921. 308 pp., illus., diagrams, charts, tab., 9 x 6 in., cloth. $8.00.

This book considers the problems of airscrew propeller design and construction from the viewpoint of designers, draftsmen, and others engaged in the practical design of aircraft. In general, it follows the methods developed by Lang Propeller, Limited. It is intended to supply directly useful information, accompanied by a proper amount of scientific explanation. The theory presented is one that has proved convenient for drafting-room use.

THE DYNAMICS OF THE AIRPLANE.

By Kenneth P. Williams. (Mathematical Monographs, 21.) N. Y., John Wiley & Sons, Inc.; Lond., Chapman & Hall, Ltd., 1921. 138 pp., diagrams, 9 x 6 in., cloth. $2.50.

This book, intended for students of mathematics and physics who are attracted by the dynamical aspect of aviation, grew out of a course of lectures on aerodynamics given by Prof. Marchis, at the University of Paris in 1919. The treatment is elementary for the most part. Contents: The Plane and Cambered Surface; Straight Horizontal Flight; Descent and Ascent; Circular Flights; The Propeller; Performance; Stability and Controllability.

THE COMPLETE AIRMAN.

By G. C. Bailey. N. Y., E. P. Dutton and Co. 269 pp., pl., diagrams, 9 x 6 in., cloth. $6.00.

This book discusses aviation in a more or less elementary fashion, for those generally interested in its technical aspects, pilots, mechanics, and managers of commercial enterprises connected with aviation. The theory of flight, the care and construction of machines, practical flying and auxiliary equipment are considered in a non-technical manner.

COMPRESSED AIR.

By Theodore Simons. Second Edition. N. Y. and Lond., McGraw-Hill Book Co., Inc., 1921. 173 pp., illus., tab., 9 x 6 in., cloth. $2.00.

This treatise is intended to give the student such an insight into the natural laws and physical principles underlying the production, transmission, and use of compressed air, as will enable him to comprehend the operation of the various appliances used for this purpose and to judge of their merit. The present edition has been carefully revised and partly rewritten.

HANDBOOK OF METALLURGY.

By Carl Schnabel. Vol. 1, Copper, Lead, Silver, Gold. Translated by Henry Louis. Third Edition. Lond., Macmillan and Co., Ltd., 1921. 1171 pp., illus., 9 x 6 in., cloth. $13.50. (Gift of The Macmillan Co., N. Y.)

The object of this treatise is to give a complete account of the metallurgical treatment of every one of the metals ordinarily used, except iron, according to modern methods, while at the same time pointing out the scientific principles underlying each process, and illustrating each by examples drawn from actual practice. The present edition has been revised independently by the translator. The form of previous editions has been kept, but the descriptions of the older and obsolete processes have been condensed and more space is given to modern methods. The book was largely in type in 1914, so lacks references to later work.

COPPER REFINING.

By Lawrence Addicks. N. Y. and Lond., McGraw-Hill Book Co., Inc., 1921. 211 pp., illus., tab., 9 x 6 in., cloth. $3.00.

Electrolytic copper refining was for so many years conducted under conditions of strict commercial secrecy that little has been published regarding the principles of operation, as distinct from descriptions of individual plants. This little book, comprising a series of articles, each dealing with one of the problems of refining, which originally appeared in *Chemical and Metallurgical Engineering*, is almost entirely a record of the author's personal experience. Contents: Metal Losses; Metals in Process; Tank Resistance; Current Density; Current Efficiency; Impurities; By-Products; Furnace Refining; The Requirements of Refined Copper; Copper from Secondary Material; The Power Problem; Elements of Design; Application to Other Fields.

ECONOMIC MINERALOGY.

By Thomas Crook. Lond. and N. Y., Longmans, Green and Co., 1921. 492 pp., illus., 9 x 6 in., cloth. $8.00.

The aim of this book is to deal with mineralogy in such a way as to meet the needs of those who wish to restrict their attention to the utilitarian side of the subject. It does not, however, treat it in a narrow way, as the scientific scope of economic mineralogy is as wide as that of academic mineralogy. Such aspects as crystallography are treated briefly, while many topics important economically are given very full treatment. In describing mineral occurrences attention is chiefly directed to those of importance to the mining industry.

WORLD ATLAS OF COMMERCIAL GEOLOGY.

Issued by the United States Geological Survey. Part 1, Distribution of Mineral Production. Wash., 1921. 72 pp., maps, 11 x 14 in., paper.

The purpose of this book is to assist the manufacturer by setting forth graphically and describing concisely the basic facts concerning the present and future sources of the useful minerals. The present part of the atlas (seventy-two maps) exhibits the world's present produc-

tion of the important minerals and its distribution. Their uses, nature, sources, distribution, centers of production and consumption and their world movements are briefly presented, accompanied by the latest available statistics. The maps are arranged in groups of three, each including a map of the world showing the production, and, for major commodities, the consumption, by countries in percentages of the world's output in 1913; maps of continents, showing production by countries, districts, or fields; and a map of the United States, giving more detail and showing production by States, fields, or districts in percentages of output for 1918.

A TEXT-BOOK OF GEOLOGY.

By Louis V. Pirsson and Charles Schuchert. Part 1, Physical Geology. Second Revised Edition. N. Y., John Wiley & Sons, Inc.; Lond., Chapman & Hall, Ltd., 1920. 470 pp., map, illus., 9 x 6 in., cloth. $3.00.

This textbook is especially intended for students of engineering, mining, metallurgy, and chemistry, to whom the subject has a direct technical value or serves as a basis for further technical studies. It is planned, while presenting the broad facts and principles of the science, to have a somewhat different character and more even balance of subject-matter than the usual textbook. The present edition has been revised, and new matter has been added where necessary, without essential change in the length of the work.

ARCHIMEDES.

By Sir Thomas Heath. (Pioneers of Progress.) Lond., Society for Promoting Christian Knowledge; N. Y., The Macmillan Co., 1920. 58 pp., front., 7 x 5 in., cloth. $0.80.

Sir Thomas Heath has written an interesting brief account, ample for the general reader, of the contributions of Archimedes to mathematics and mechanics and the significance of his work.

EMPLOYEE TRAINING.

By John Van Liew Morris. N. Y. and Lond., McGraw-Hill Book Co., Inc., 1921. 311 pp., 8 x 6 in., cloth. $3.00.

This work presents the results of an inquiry into the programmes and organization machinery being utilized by various manufacturing concerns to train their own workers, both by apprenticeship courses and by vocational training. It shows industry's own solution of its training problems and should be suggestive to manufacturers as a collection of tried methods.

INSTALLING MANAGEMENT IN WOOD-WORKING PLANTS.

By Carle M. Bigelow. N. Y., The Engineering Magazine Co., 1920. 323 pp., illus., 9 x 6 in., cloth. $5.00. (Gift of *Industrial Management.*)

The author's purpose has been twofold: First, to express in a general way his ideas as to the application of the principles of scientific management to an industry; and, second to outline in detail their application to the specific problems of the wood-working industry. Contents: Traditional Peculiarities of Woodworking Making Scientific Management Essential; Organization and Its Installation; Product; Lumber; Purchasing and Storing; Planning Department; Layout and Routing of the Plant; Shop Practice and Standardization; The Cutting of Lumber; Labor Control; Tool and Fixture Control; Repair Control; Waste Control; Power Plant; Cost Accounting; Results to be Expected by Application of Methods Outlined.

TRADE TESTS; THE SCIENTIFIC MEASUREMENT OF TRADE PROFICIENCY.

By J. Crosby Chapman, with the Assistance of D. R. Chapman. N. Y., Henry Holt and Co., 1921. 435 pp., illus., 9 x 6 in., cloth. $4.00.

During the war, the War Department undertook extensive researches in the effort to solve the problem of placing its skilled workers. One important result of the experimentation was the trade test, devised to enable a trained examiner, unskilled in any trade, to measure the trade standing of a person claiming skill in any of the trades necessary to the Army. The present volume sets forth some of the results obtained. Samples of oral, picture, performance, and written trade tests for various trades are shown, with comment on their use. The place of such tests in industry is discussed.

STUDIES IN FRENCH FORESTRY.

By Theodore S. Woolsey, Jr. With Two Chapters by W. B. Greeley. N. Y., John Wiley & Sons, Inc.; Lond., Chapman & Hall, Ltd., 1920. 550 pp., illus., tab., 9 x 6 in., cloth. $6.00.

This book is a study of the theory and practice of French forest administration and management, based on extended trips through French forests, and an examination of the standard authorities. It supplements the author's previous volume, "French Forests and Forestry", which describes the forests and forestry of Algeria, Tunisia, and Corsica. Contents: Impressions of French Forestry; The Rôle of Forests; Forest Regions and Important Species; Forest Statistical

Data; Natural Regeneration; Artificial Reforestation; Control of Erosion in the Mountains; Forestry in the Landes; Government Regulation and Working Plans; Features of French National Forest Administration; Private Forestry in France; The American Forest Engineers in France.

PLANE ALGEBRAIC CURVES.

By Harold Hilton. Oxford, Clarendon Press, 1920. 388 pp., diagrams, 9 x 6 in., cloth. $12.60. (Gift of the American Branch of the Oxford University Press.)

Though the theory of plane algebraic curves still attracts mathematical students, the English reader has not many suitable books at his disposal. Salmon's classic treatise was last published some forty years ago and has long been out of print. Mr. Hilton therefore has thought a new book desirable, if only to bring more recent developments within reach of the student. His book, although based on previous texts, has been largely extracted from mathematical periodicals, supplemented by his own studies, and attempts to be reasonably complete.

THE PRINCIPLES OF THE PHASE THEORY.

By Douglas A. Clibbens. Lond., Macmillan and Co., Ltd., 1920. 383 pp., diagrams, 9 x 6 in., cloth. $10.00. (Gift of The Macmillan Co., N. Y.)

As the author believes that a thorough study of the condensed system offers the easiest path to a true understanding of the methods of the phase theory, he has given a general title to his book, which in reality is limited to the consideration of condensed systems which include only one liquid phase, and that the only phase of variable composition. The book is written primarily for readers unfamiliar with the subject.

THE NEW PHYSICS.

By Albert C. Crehore. San Francisco, Journal of Electricity, 1920. 111 pp., 6 x 5 in., cloth.

This little book presents some results of the author's study of the fundamental conceptions and laws of physics. It gives new expressions for Rydberg's and Planck's constants, which connect them in various ways with the electrical charge and the mass of the hydrogen atom, a reduction of the electrostatic and electromagnetic systems of units to one common system in terms of length and time, and the author's theory of the atom.

A TEXTBOOK OF PHYSICS.

By W. Watson. Seventh Edition, Revised by Herbert Moss. Lond. and N. Y., Longmans, Green & Co., 1921. 976 pp., illus., diagrams, 8 x 5 in., cloth. $6.00.

Since the publication of the sixth edition, this textbook has undergone considerable revision, during which those sections dealing with subjects in which important recent work has been done, have been revised and extended. The book is intended for students of college grade, already familiar with the elements of the subject, who desire a more extended discussion.

A TEXTBOOK OF ORGANIC CHEMISTRY.

By A. F. Holleman. Edited by A. J. Walker, Assisted by O. E. Mott. Fifth English Edition, Completely Revised. N. Y., John Wiley & Sons, Inc.; Lond., Chapman & Hall, Ltd., 1920. 642 pp., illus., 9 x 6 in., cloth. $3.50.

Most of the short textbooks of organic chemistry, according to this author, contain a great number of isolated facts and describe so considerable a number of compounds that the beginner is confused. Moreover, the theoretical grounds are often kept in the background. In this book he has endeavored to keep the number of unconnected facts within narrow limits and to give prominence to the underlying theory. The present edition has been carefully revised and partly rewritten.

TECHNICAL METHODS OF ANALYSIS,

As Employed in the Laboratories of Arthur D. Little, Inc., Cambridge, Mass. Edited by Roger Castle Griffin. (International Chemical Series.) N. Y. and Lond., McGraw-Hill Book Co., Inc., 1921. 666 pp., illus., tab., 8 x 6 in., cloth. $5.00.

This is an extensive handbook for the analytical chemist, based on the experience of a large commercial laboratory, in which most of the methods given have been used many times. Standard procedures adopted by bodies of chemists have also been included. The book is intended to include the methods commonly needed in general commercial work, but material on drugs, alkaloids, medicines, rare earths, rocks, glasses, and other substances, has been excluded. The chief materials discussed are the important organic compounds, metals, fuels, paints, oils, fats, soaps, wood, paper, textiles, and foodstuffs. Brief descriptions of the normal properties are frequently given, and the subject-matter includes a six-page bibliography.

CHEMISTRY OF PULP AND PAPER MAKING.

By Edwin Sutermeister. N. Y., John Wiley & Sons, Inc.; Lond. Chapman & Hall, Ltd., 1920. 479 pp., pl., illus., tab., 9 x 6 in., cloth. $6.00.

This book is intended for the chemist and chemical engineer. It discusses the chemical aspects of the pulp and paper industry in detail, omitting the mechanical phases of the subject. It is based, the author states, on his experience as a paper-mill chemist during twenty years, and a review of the existing literature.

THE MANUFACTURE OF PULP AND PAPER:

Vol. 1, Arithmetic, Elementary Applied Mathematics, How to Read Drawings, Elements of Physics. By J. J. Clark. N. Y. and Lond., McGraw-Hill Book Co., Inc., 1921. 132 pp., illus., 9 x 6 in., cloth. $5.00.

This book is the first of a series of five volumes, prepared under the auspices of the Canadian Pulp and Paper Association and the Technical Association of the Pulp and Paper Industry, and is intended to form a suitable course of study in the fundamentals of mathematics and science and the manufacturing operations involved in modern pulp and paper practice. The treatment is simple, as the books are intended for self-instruction, as well as for classroom use.

THE SUGAR-BEET IN AMERICA.

By F. S. Harris. (The Rural Science Series.) N. Y., The Macmillan Co., 1919. 342 pp., pl., illus., tab., 8 x 5 in., cloth. $2.25.

This volume gives an account of the important facts regarding sugar-beet production and the beet-sugar manufacture, as developed in America. Attention is directed chiefly to the agricultural problems involved, rather than to the chemical and engineering aspects of sugar-making. A bibliography is included.

DAVISON'S SILK TRADE:

Twenty-sixth Annual Edition, 1921. Pocket Edition. N. Y., Davison Publishing Co. 776 pp., 8 x 5 in., cloth. $4.00.

The directory of silk mills is arranged both geographically and by products, dyers and finishers geographically, the dealers by commodities. An index of mills is included. Full information as to the size of mills, their products, officers, etc., is also included.

DAVISON'S TEXTILE "BLUE BOOK", UNITED STATES AND CANADA:

Thirty-third Annual Edition, July, 1920, to July, 1921. Office Edition. N. Y., Davison Publishing Co. 1748 pp., maps, 9 x 7 in., cloth. $7.50.

This directory covers the entire textile industry. The mills of the country are listed geographically under their products, and their sizes, officers, and products noted. Commission merchants, dealers in raw and semi-finished materials, rags, waste, etc., are also included, as well as a directory of dealers in textile-mill supplies.

HENDRICKS' COMMERCIAL REGISTER OF THE UNITED STATES:

Twenty-ninth Annual Edition (1921). N. Y., S. E. Hendricks Co., Inc. 2572 pp., 10 x 8 in., cloth. $12.50.

This well-known classified directory of manufacturers and dealers in supplies used by engineering firms has been carefully revised, new firms have been added, and those no longer extant have been eliminated. As in previous issues, the directory includes a classified list of dealers, an alphabetical list, an index of trade names, and an index of commodities.

REINFORCED CONCRETE DESIGN:

Vol. 1, Theory. By Oscar Faber and P. G. Bowie. Second Edition. Lond., Edward Arnold, 1919. 332 pp., illus., 9 x 6 in., cloth. $5.00; Vol. 2, Practice. By Oscar Faber. N. Y., Longmans, Green & Co.; Lond., Edward Arnold, 1920. 246 pp., illus., 9 x 6 in., cloth. $6.50.

In 1912 the author published a volume on the theory of reinforced concrete design. This now reappears, with minor corrections, and accompanied by a second volume on practice. The first volume discusses the calculation of stresses under known forces and moments, the design of columns, beams, and slabs, and the application of these principles to reservoirs and retaining walls. A chapter on specifications is included, and an appendix giving mathematical analyses of beams under various conditions of loading and fixing. Vol. 2 is intended chiefly to give material which either exists in or can be derived from Vol. 1, in convenient form for ready reference. From it the bending moments in any beam or column, with any ratio of live to dead load, any distribution of load, etc., may be found by simple inspection.

MASONRY STRUCTURES.

By Frederick P. Spalding. N. Y., John Wiley & Sons, Inc.; Lond., Chapman & Hall, Ltd., 1921. 404 pp., illus., tab., 9 x 6 in., cloth. $3.50.

This book is designed to present, in a brief and systematic manner, the fundamental principles involved in the design and construction of masonry structures. The term, masonry, has been construed to include concrete. As the field covered is very wide, it has been necessary to select for discussion those types which most adequately illustrate principles, without attempting to cover the details of all classes of masonry structures. The book is intended as an introduction to the subject.

A TEXTBOOK OF SURVEYING AND LEVELLING.

By H. Threlfall. Lond., Charles Griffin & Co., Ltd.; Phila., J. B. Lippincott Co., 1920. 663 pp., pl., diagrams, 8 x 6 in., cloth. (Gift of J. B. Lippincott Company.)

This textbook is intended to meet the needs of both architects and civil engineers interested in surveying as the preliminary to further operations, and surveyors for whom it is the sole object. It is the outcome of the author's practical experience in the field and as a teacher in the Municipal College of Technology, Manchester, England.

DONATIONS TO THE READING ROOM

E. I. du PONT de NEMOURS AND COMPANY:

A History, 1802-1902. By Mrs. B. G. du Pont. Bost. and N. Y., Houghton Mifflin Company, 1920. 196 pp., illus., 8 x 5½ in., cloth. $3.00.

This book, it is stated, is an authoritative history, by a member of the family, of one of the most unusual and interesting of the great American business enterprises. The growth of the business from its organization in 1802 by E. I. du Pont who had escaped the French Revolution and had come to the United States in 1793, is given in detail, and as the Company has been intimately connected with the Federal Government during various critical periods, the story, it is stated, is also an illuminating sidelight on American history.

THE MORALS OF ECONOMIC INTERNATIONALISM.

By J. A. Hobson. (Barbara Weinstock Lectures on the Morals of Trade.) Bost. and N. Y., Houghton Mifflin Company, 1920. 69 pp., 7 x 5 in., cloth. $1.00. (Gift of the Univ. of California Press.)

This volume contains one of a series of lectures instituted at the University of California under the Weinstock Foundation, by representative scholars and men of affairs, dealing with various phases of the moral law in its bearing on business life under the new economic order. The subject-matter of this lecture relates particularly to the commercial relationship of the United States with European nations with reference to the need for effective co-operation in economic resources and opportunities by the former.

LABOR'S CRISIS: AN EMPLOYER'S VIEW OF LABOR PROBLEMS.

By Sigmund Mendelsohn. N. Y., The Macmillan Company, 1920. 12 + 171 pp., 7 x 5 in., cloth. $1.50.

The views and observations on the labor question presented in this volume are based, it is stated, on the practical experience of an employer who has had to deal with the facts, not the theories, which determine the relationship of capital and labor, and relate chiefly to the causes and effects of the present-day labor unrest.

DETROIT AND WORLD TRADE:

A Survey of the City's Present and Potential Foreign Trade and Seaboard Traffic, and the Facilities Therefor, with Special Reference to the Proposed St. Lawrence Deep Waterway to the Sea. By Thomas Lawrence Munger. Detroit, Mich., Detroit Board of Commerce, 1920. 117 + 2 pp., illus., tab., maps, 9 x 6 in., cloth. (Gift of W. H. Adams, M. Am. Soc. C. E.)

As stated in the secondary title, the object of this book is to present, as completely as possible, a survey of the industrial and commercial development of the City of Detroit and contiguous territory from the earliest days to the present time, with particular reference to the part played in such development by transportation facilities, as a brief of Detroit's case in support of the proposed Great Lakes-St. Lawrence Deep Waterway to the sea.

MEMBERSHIP

(From March 4th to April 7th, 1921)

ADDITIONS

MEMBERS

		Date of Membership.
AIKMAN, HAL NELSON. 24 South Judson St., Fort Scott, Kans.		Oct. 11, 1920
ALDRICH, LLOYD. County Engr., Sonoma County, 57 Post St., Room 811, San Francisco, Cal.		Mar. 7, 1921
BALDWIN, GEORGE CLYDE. Hydr. Engr., U. S. Geological Survey, Box 467, Idaho Falls, Idaho.	Assoc. M.	April 4, 1911
	M.	Mar. 8, 1921
BECKER, SYLVANUS A. Asst. Prof., Civ. Eng., Lehigh Univ., 3 East North St., Bethlehem, Pa.	Jun.	Dec. 1, 1903
	Assoc. M.	Feb. 5, 1908
	M.	Mar. 8, 1921
BENNETT, GEORGE LEWIS. Cons. Economist and Engr., 2 East 41st St., New York City.		Mar. 7, 1921
BOSIER, WILLIAM HARRIS. Contr. Mgr., Union Bridge & Constr. Co., 903 Sharp Bldg., Kansas City, Mo.		Mar. 7, 1921
CALVERT, LOUIS LAY. Care, Tide-Water Bldg. Co., 16 East 33d St., New York City.		Mar. 7, 1921
CLEVERDON, WALTER SHERMAN LYLE. Associate Prof. of San. Eng., New York Univ. (Res., 2323 Loring Pl.), New York City.		Mar. 7, 1921
D'ANTONA, ATTILIO. Cons. Engr., 71 West 23d St., New York City.		Oct. 11, 1920
FIFER, FRANK PRESTON. Asst. Engr., Hugh L. Cooper & Co., East Florence, Ala.	Assoc. M.	Oct. 1, 1913
	M.	Mar. 8, 1921
FOX, CHARLES LOUIS. Asst. Supt., Pennsylvania Water Co., 712 South Ave., Wilkinsburg, Pa.	Jun.	May 5, 1903
	Assoc. M.	May 2, 1911
	M.	Mar. 8, 1921
GARRATT, ALLAN VINAL. Cons. Engr., Lockwood, Greene & Co., Winter St., Holliston, Mass.		Mar. 7, 1921
GILMORE, MAURICE EUGENE. Chf. Engr., R. W. Hebard & Co., 50 Broad St., New York City.		Mar. 7, 1921
HALMOS, EUGENE ERWIN. Designing Engr., Parsons, Klapp, Brinckerhoff & Douglas, 614 West 189th St., New York City.		Oct. 11, 1920
HATTA, YOSHIAKI. Civ. Engr., Government Rys., Tokyo, Japan.		Nov. 9, 1920
HOWELL, CLEVES HARRISON. Engr., U. S. Reclamation Service, 512 Tramway Bldg., Denver, Colo.	Assoc. M.	Feb. 28, 1911
	M.	Jan. 18, 1921
HUIE, IRVING VAN ARNAM. Branch Mgr., The Austin-Western Road Machinery Co., 149 Center St., New York City.	Jun.	May 7, 1913
	Assoc. M.	May 31, 1916
	M.	Mar. 8, 1921
JACOB, BRENT COOKE. Elec. and Mech. Engr., Estimating Dept., Brown Hoisting Machinery Co., 12330 Forest Grove Ave., Cleveland, Ohio.		Mar. 7, 1921
LILLIESTRAND, CARL EMIL. First Asst. Engr., Bldg. Dept., Gen. Elec. Co., 292 North St., Pittsfield, Mass.		Mar. 7, 1921
LINDLEY, EDWARD SEARLES. Executive Engr., Indian Public Works Dept., Panjab Irrig. Branch, Jhang-Maghiana, Panjab, India.	Assoc. M.	Mar. 11, 1919
	M.	Oct. 11, 1920
MCLEOD, DONALD FRASER. Prof. of Municipal Eng., Univ. of Mississippi, University, Miss.	Assoc. M.	April 30, 1912
	M.	Mar. 8, 1921
OKAZAKI, BUNKICHI. Engr., Upper Liao River Conservancy Board, Newchwang, China.		May 12, 1919

MEMBERS (*Continued*)

		Date of Membership.
OXNARD, HORACE WHITCOMB. Pilot Engr., A. T. & S. F. Ry., 314 Huntoon St., Topeka, Kans		Mar. 7, 1921
POOLE, CHARLES ARTHUR. City Engr., 52 City Hall, Rochester, N. Y.	Assoc. M.	June 5, 1907
	M.	Mar. 8, 1921
PUTNAM, WILLIAM ELI. Prin. Asst. Engr., Robert L. Totten, 1320 Jefferson County Bank Bldg., Birmingham, Ala		Dec. 6, 1920
RAMSER, CHARLES ERNEST. Senior Drainage Engr., Bureau of Public Roads, U. S. Dept. of Agriculture, Washington, D. C.	Jun.	Mar. 1, 1910
	Assoc. M.	June 11, 1917
	M.	Mar. 8, 1921
ST. JOHN, ERASTUS ROOT. Res. Engr., U. S. Steel Products Co., 88 Front St., Binghamton, N. Y.		Mar. 7, 1921
SCOBEY, FREDERICK CHARLES. Senior Irrig. Engr., Irrig. Div., Bureau of Public Roads, U. S. Dept. of Agriculture, Federal Bldg., Berkeley, Cal.	Assoc. M.	April 2, 1913
	M.	Mar. 8, 1921
SHERMAN, JOHN ROCKWOOD. Engr., Kittitas Reclamation Dist., Ellensburg, Wash.	Assoc. M.	Sept. 12, 1916
	M.	Mar. 8, 1921
SLAYBACK, CLINT SANFORD. Eng. Dept., The Texas Co., Box 455, Cisco, Tex.		Mar. 7, 1921
WESTCOTT, WILLIS LOTHAIR. Chf. Draftsman, Structural Dept., Brown Hoisting Machinery Co., 4403 St. Clair St., Cleveland, Ohio		Mar. 7, 1921
WHITNEY, HOWARD ROGERS. Asst. to Pres., Springfield St. Ry., Worcester Consolidated St. Ry., Milford, Attleboro & Woonsocket St. Ry., Interstate Consolidated St. Ry., Attleboro Branch R. R., 5 Blaine St., Springfield, Mass.		Mar. 7, 1921
WHITNEY, PAUL CLINTON. Chf., Coast Pilot Section, U. S. Coast and Geodetic Survey, Washington, D. C.		Mar. 7, 1921
YOUNG, CHARLES GRIFFITH. Cons. Engr. (The C. G. Young Co., Inc.), 501 Fifth Ave., New York City	Assoc. M.	Mar. 6, 1894
	M.	Mar. 8, 1921

ASSOCIATE MEMBERS

ARCHER, JAMES HENRY. (Southern Eng. Co.), Box 567, Clarksdale, Miss.		Mar. 7, 1921
BALDWIN, JAMES MANOR. Engr. in Chg. of Constr., W. T. Grange Constr. Co., 1602 Keenan Bldg., Pittsburgh, Pa.		Mar. 7, 1921
BALL, ETHAN FRANK. Designer and Estimator, McClintic-Marshall Co., 7127 Race St., Pittsburgh, Pa.		Mar. 7, 1921
BEDELL, ARCHER WILSEY. Designing Engr., Municipal Eng. Co., Box 221, Mason City, Iowa		Mar. 7, 1921
CASTILLO, DEMETRO DEL, JR. 19th and L Sts., Vedado, Havana, Cuba		Nov. 9, 1920
CHADWICK, CLIFTON HARLAND. Estimating Engr., Dwight P. Robinson & Co., Inc., 125 East 46th St., New York City		Mar. 7, 1921
CHAMBERLAIN, MILTON EARL. Engr., Booth & Flinn, Ltd., 11 Van Ness Ave., Rutherford, N. J.		Mar. 7, 1921
CHENEY, JAMES BURLEIGH. Pres. and Treas., Cheney & Co., Inc., 110 West 40th St., New York City		Jan. 17, 1921
CLARKE, ALFRED HENRY. Asst. Engr., Bemis Bros. Bag Co., St. Louis, Mo.	Jun.	Sept. 3, 1913
	Assoc. M.	Jan. 17, 1921
CONNOLLY, ALLEN HOWARD. Asst. Gen. Sales Mgr., Haley-Neeley Co., Sioux Falls, S. Dak.	Jun.	Oct. 7, 1914
	Assoc. M.	Nov. 9, 1920

ASSOCIATE MEMBERS—(*Continued*)

	Date of Membership.
CORRIDON, JOSEPH BERNARD. With Stone & Webster, Inc., 27 West North Ave., Baltimore, Md.	Mar. 7, 1921
CUNNINGHAM, FRED GASTON. Associate with William G. Clark, 1046 Spitzer Bldg., Toledo, Ohio.	Mar. 7, 1921
DAVIDSON, GEORGE BURRETT. 449 Prince Bay Rd., Staten Island, N. Y.	Jun. Aug. 31, 1915 Assoc. M. Mar. 7, 1921
DAY, WILLARD FARNSWORTH. County Engr., Campbell County, Box 392, Lynchburg, Va.	Jun. Sept. 9, 1919 Assoc. M. Mar. 7, 1921
DIAMANT, ALBERT. Asst. Engr. in Chg. of Constr., Chile Exploration Co., Tocopilla, Chile.	Jan. 17, 1921
DODDS, JOHN SIMPSON. Associate Prof., Civ. Eng., Iowa State Coll., West Gate Cottage, Station A, Ames, Iowa.	Mar. 7, 1921
DORNBUSH, GEORGE ALBERT. Structural Engr., The W. G. Wilkins Co., 1401 North St. Clair St., Pittsburgh, Pa.	Jan. 17, 1921
ELIAS, MAURICE. 18bis rue de Chartres, Neuilly-S/-Seine, France.	Jan. 19, 1920
ELY, FREDERICK WARREN. Asst. Engr., Hydr. Dept., Aluminum Co. of America, 509 Elliott St., Wilkinsburg, Pa.	Jan. 17, 1921
FERRIS, HERBERT WILLIAM. Chf. Engr., North-Eastern Constr. Co., 3330 Perry Ave., New York City.	Mar. 7, 1921
FLANNERY, EARL HARRELL. Asst. Engr., Newsom Eng. Co., 417 Poplar St., Wynne, Ark.	Mar. 7, 1921
GORDY, SCHLEY. Supt. of Public Works, and City Engr., Box 507, Columbus, Ga.	Mar. 7, 1921
GOYETTE, ERNEST FRED. Designer and Draftsman, Strathmore Paper Co., Mittineague (Res., 96 Abbe Ave., Springfield), Mass.	Mar. 7, 1921
HALL, ALBERT EDMUND STOCKDALE. Asst. in Chg., Civ. Eng. Section, E. I. du Pont de Nemours & Co., 1016 Monroe St., Wilmington, Del.	Mar. 7, 1921
HARDISON, ROBERT MCKENZIE. Dist. Engr., Corrugated Bar Co., 27 School St., Room 225, Boston, Mass.	Mar. 7, 1921
HARSHBARGER, EUGENE LEE. Chf. Engr., Truscon Steel Co., Box 1121, Houston, Tex.	Mar. 7, 1921
HAVENS, WILLIAM LOUIS. Asst. San. Engr., Div. of Eng. and Constr., City of Cleveland, 618 City Hall, Cleveland, Ohio.	Jun. Oct. 10, 1916 Assoc. M. Mar. 7, 1921
JOHNSON, ARCADIUS LARS PETER. Asst. Engr., Warren W. Chapin, 347 Madison Ave. (Res., 162 East 36th St.), New York City.	Jun. June 4, 1913 Assoc. M. Mar. 7, 1921
KARGE, FRITZ WILHELM. Designer, Eng. Dept., Union Oil Co. of California, 1304 Union Oil Bldg., Los Angeles, Cal.	Mar. 7, 1921
KNOX, WILSON HOMER. Asst. Engr., Water Dept., City of Cleveland, 7605 Franklin Ave., Cleveland, Ohio.	Mar. 7, 1921
LENERT, LOUVA GERHARD. Asst. San. Engr., U. S. Public Health Service, La Grange, Tex.	Oct. 11, 1920
LEON, MILTON. Asst. City Engr., Severs Hotel, Muskogee, Okla.	Mar. 7, 1921
MCCREA, CHARLES HAROLD. 1850 Railway Exchange Bldg., St. Louis, Mo.	Mar. 7, 1921
MERRILL, EDWIN CARLETON. Bldg. Contr. (B. J. Hines & Co.), 388 Main St., New Rochelle, N. Y.	Mar. 7, 1921

ASSOCIATE MEMBERS—(*Continued*)

		Date of Membership.
Morrell, Ralph Leonard. 4200 Wilcox St., Chicago, Ill..	Jun.	Nov. 25, 1919
	Assoc. M.	Mar. 7, 1921
Peck, John Sanford. 403 West 115th St., New York City.....	Jun.	Nov. 28, 1916
	Assoc. M.	Jan. 17, 1921
Peterson, Joseph Henry. Engr., George A. Fuller Co., 87 Ardale St., Roslindale, Mass.....		Mar. 7, 1921
Plaskett, Clyde Arthur. Asst. Engr., Forest Products, Forest Products Laboratory, U. S. Dept. of Agriculture, 416 North Frances St., Madison, Wis.....		Jan. 17, 1921
Reagan, John Green. Asst. City Engr., City Hall, Cisco, Tex.....		Mar. 7, 1921
Robert, Lawrence Wood, Jr. Archt. and Engr. (Robert & Co.), Red Cross Bldg., Atlanta, Ga.....		Mar. 7, 1921
Sauer, Herbert Oswald. Chf. Draftsman, Elec. Eng. Dept., Consolidated Gas & Elec. Light & Power Co., Baltimore, Md.....		Mar. 7, 1921
Smith, Arthur Richards. Asst. Engr., Constr. Dept., Bureau of Tests, State Highway Comm., Box 279, Route D, Indianapolis, Ind.....		Oct. 11, 1920
Snow, Edward Cortlandt. Reservoir Supt., Elephant Butte Dam, U. S. Reclamation Service, Elephant Butte, *via* Engle, N. Mex...		Mar. 7, 1921
Spears, Charles Alvah. Vice-Pres. and Gen. Mgr., Spears-Wells Machinery Co., 6122 Lawton Ave., Oakland, Cal.....		Mar. 7, 1921
Tunis, Harry Ogle. Capt., Corps of Engrs., U. S. A., Headquarters, 16th Ry. Engr. Bn., Coblenz, Germany.....		Oct. 11, 1920
Van Ness, Russell Alger. Asst. Engr., Bridge Dept., A. T. & S. F. Ry., 1033 Railway Exchange Bldg., Chicago, Ill.....	Jun.	Dec. 6, 1915
	Assoc. M.	Mar. 7, 1921
Waugh, Edward Ardis. Mgr. of Constr., Milwaukee Bldg. Co., 315 Wright Callender Bldg., Los Angeles, Cal.....		Mar. 7, 1921
Williford, Carl Lex. Engr., The Texas Co., 4609 Rusk Ave., Houston, Tex.....		Mar. 7, 1921

ASSOCIATES

Ellis, William Henry. Pres. and Treas., W. H. Ellis & Son Co., 479 Meridian St., East Boston, Mass.....	Mar. 7, 1921
Fellows, Frank Shepley. Mgr., Cleveland Office, George A. Fuller Co., 1644 Ansel Road, Cleveland, Ohio.....	Mar. 7, 1921
Schneider, Edwin Wallace. Washington and Southern Mgr., The H. D. Watts Co., 1434 Harvard St., Washington, D. C.....	Mar. 7, 1921
Scott, Allan Ralph. Box 964, Roundup, Mont.....	Nov. 9, 1920
Seney, Howard Ignatius. Sales Engr., Toch Bros., 176 East 81st St., New York City.....	Mar. 7, 1921
Williams, Robert Kent. 671 Auburn Ave., Buffalo, N. Y.....	Oct. 11, 1920

JUNIORS

Arthur, Malcolm Boyd. Care, Fred T. Ley & Co., Inc., Lima, Peru....	Jan. 17, 1921
Camp, Thomas Ringgold. Care, Nagle, Witt, Rollins Eng. Co., Box 8, Breckenridge, Tex.....	Mar. 7, 1921
Elkins, Samuel Sinclair. Hingham, Mass.....	Jan. 17, 1921
Germain, Eduardo, Jr. Pedro Montt 411, Valparaiso, Chile.....	Nov. 9, 1920
Harris, Jefferson Davis. Chf. Engr., Simms Oil Co., Shreveport, La..	Mar. 7, 1921
Hou, Chia-Yuen. Box 461, Pottstown, Pa.....	Mar. 7, 1921

JUNIORS—(*Continued*)

	Date of Membership.
MEAD, HAROLD WASHBURN. Instrumentman, Mead & Seastone, 120 West Gorham St., Madison, Wis.	Mar. 7, 1921
MORTENSON, CHARLES NELDON. With Utah State Road Comm., 244 West 4th St., Salt Lake City, Utah.	Mar. 7, 1921
O'BRIEN, EDWARD CAREY. Asst. Engr., N. Y. C. R. R., 39 West 17th St., New York City.	Mar. 7, 1921
PENNEY, NORMAN. Engr., James Stewart & Co., 30 Church St., New York City.	Mar. 7, 1921
PHILLIPS, ROBERT JAMES. Care, Foreign Trade Dept., The Truscon Steel Co., 2 Rector St., New York City.	Dec. 6, 1920
PODOLOFF, NATHAN. 550 West 153d St., New York City.	Mar. 7, 1921
RICH, GEORGE ROLLO. Reinforced Concrete Designer, Stone & Webster, Inc., 12 Francis St., Worcester, Mass.	Mar. 7, 1921
RUFF, CHARLES FREDERICK. 109 St. Marks Pl., New Brighton, N. Y.	Mar. 7, 1921
SAPH, AUGUSTUS VICTOR. 2230 Chapel St., Berkeley, Cal.	Mar. 7. 1921
VAZQUEZ DEL MERCADO Y DE AGUILAR, FRANCISCO. Asst. Engr., Eng. Dept., Huasteca Petroleum Co., Box 963, Tampico (Res., 758 Madero Ave., Guadalajara, Jalisco), Mexico.	Nov. 9, 1920
WALLACE, AARON VAN DUZER, JR. 665 West Front St., Cincinnati, Ohio.	Nov. 9, 1920
WEISKOPF, WALTER HERBERT. Draftsman, Am. Bridge Co., 5217 Ridge Ave., Philadelphia, Pa.	Mar. 7, 1921

REINSTATEMENTS

MEMBERS

	Date of Reinstatement.
BARRALLY, THOMAS WEBSTER.	Mar. 7, 1921

ASSOCIATE MEMBERS

SHELLENBERGER, LEIDY RUDY.	Mar. 7, 1921

DEATHS

BRENTON, WILLIAM HENRY. Elected Member, April 18th, 1916; died February 11th, 1921.

BURKE, JOHN RYAN. Elected Member, September 12th, 1916; died April 27th, 1920.

LUCAS, EUGENE WILLETT VAN COURT. Elected Associate Member, April 3d, 1895; Member, September 5th, 1900; died March 8th, 1921.

MARTIN, WISNER. Elected Junior, May 3d, 1892; Associate Member, July 3d, 1895; Member, May 1st, 1901; died May 24th, 1919.

SAMUELSON, BERNHARD MARTIN. Elected Member, March 11th, 1919; died February 20th, 1921.

TOMKINS, CALVIN. Elected Associate, January 6th, 1886; died March 13th, 1921.

Total Membership of the Society, April 7th, 1921, 9 971.